QUARTERLY REVIEW of UROLOGY

Vol. 4 No. 4 December 1949

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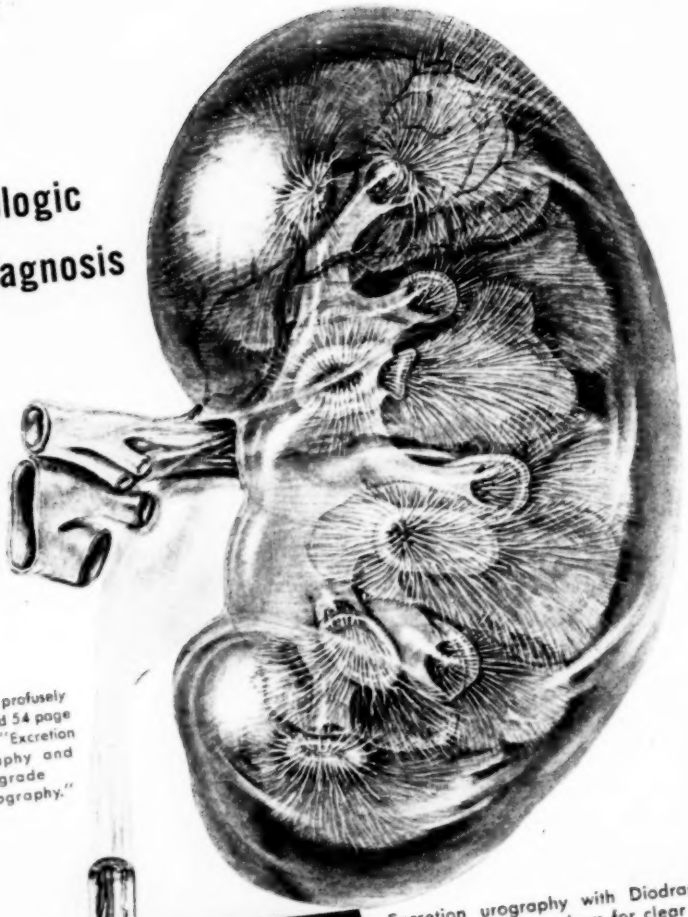

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Published quarterly in March, June, September and December. The annual cumulative subject and author index is bound in the December issue.

Subscription rate: $11.00 per year; $28.00 for 3 years.

WASHINGTON INSTITUTE OF MEDICINE

Editorial and Administrative Departments:
1708 Massachusetts Ave., N. W.
Washington 6, D. C.

Advertising Department:
2000 Connecticut Ave., N. W.
Suite 710
Washington 8, D. C.

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FOREWORD

The QUARTERLY REVIEW OF UROLOGY is designed to present in a concise and authoritative manner not only all progress in the field of Urology alone, but also important developments in other branches of Medicine which are or may become of urologic significance. For a single individual to keep abreast of this mass of material, in which Urology is often inextricably intertwined with other clinical and preclnical sciences, heretofore has been impossible.

The members of the Editorial Board are charged with the responsibility of selecting from every dependable source all contributions which in their judgment are of fundamental importance and unusual merit, to which they may add their own comments. This material is classified under the following headings:

1. Nutrition and Metabolism
2. Preoperative and Postoperative Therapy
3. Anesthesia
4. General Surgical Technic
5. Infections, Parasites, Toxins and Drugs
6. Calculosis
7. Hemorrhage and Shock
8. Anomaly
9. Kidney and Capsules
10. Ureter
11. Bladder and Urachus
12. Urethra and Glands
13. Penis
14. Urine and Semen
15. Scrotum
16. Testis
17. Epididymis
18. Spermatic Cord and Vas
19. Seminal Vesicles and Ejaculatory Ducts
20. Prostate and Verumontanum
21. The Musculoskeletal System
22. The Respiratory System
23. The Cardiovascular System
24. The Hemic and Lymphatic Systems
25. The Digestive System
26. The Endocrine System
27. The Nervous System
28. Cancer Research
29. Urologic Armamentarium

Each anatomic division includes Embryology, Pathology, Diagnosis, and Treatment, and some also embrace Biochemistry, Physiology, and Pharmacology.

At the end of each division there will be references to current articles not abstracted that may be useful to authors in the compilation of their bibliographies.

The Editorial Board will welcome suggestions and criticisms.

HUGH J. JEWETT, M.D.
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UROLOGY

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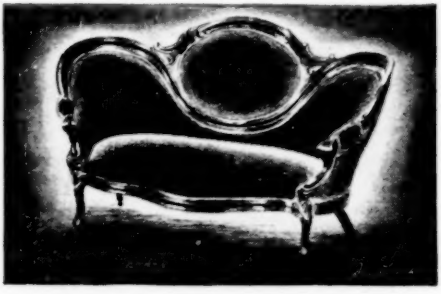

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QUARTERLY REVIEW

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Volume 4 Number 4

December 1949

1. Nutrition and Metabolism

The Place of Electrolyte Studies in Surgical Patients. *John S. Lockwood and H. T. Randall, Presbyterian Hospital, and Columbia University, New York, N. Y.* Bull. New York Acad. Med. 25: 228-43, April 1949.

The problems of water and electrolyte balance are important in surgery because of the many cases of dehydration encountered and because of the frequent need to rely on parenteral fluid therapy for long periods. Clinical problems of electrolyte balance in surgery fall into 3 major classes: 1) preoperative correction of dehydration and electrolyte losses caused by the patient's disease; this category includes pyloric stenosis, intestinal obstruction, peritonitis, pancreatitis, and severe burns; 2) the prevention and treatment of imbalance from operative procedure and its immediate sequelae; examples include ileostomy, biliary or pancreatic fistula, and tube drainage in the alimentary canal; 3) there are many problems arising from improper fluid replacement therapy. In meeting all these problems, the surgeon should be conversant with modern terminology as to water exchange and ion equivalents.

Special points must be borne in mind: 1) changes in weight of the patient from day to day are a very useful index of over-all changes in hydration; sudden changes in weight must always be accounted for; 2) fluid should be given orally rather than parenterally whenever possible; 3) there are dangers in excessive therapy with sodium chloride, especially during periods of postoperative and post-traumatic renal dysfunction. Finally, a potassium deficiency syndrome can occur in patients who are given excessive sodium for treatment or prevention of severe dehydration, and also in patients who are on potassium-free fluids exclusively for several days. 13 references. 3 tables. 1 figure.

2. Preoperative and Postoperative Therapy

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5. Infections, Parasites, Toxins and Drugs

A Cultural Method for the Diagnosis of Trichomonad Infestations. *J. Jerry Lash and Elmer Belt, Los Angeles, Calif.* Am. J. Obst. & Gynec. 57: 980-83, May 1949.

Fifty-one of 58 cases having trichomonad vaginitis were diagnosed by usual laboratory methods; the other supposedly negative cases were culturally diagnosed as positive by use of a yeast protein hydrolysate-enriched medium. The use of this cultural method is urged as a diagnostic aid. Two illustrative cases are presented.

The genital area is cleaned with green soap solution followed by distilled water. An unlubricated, sterile vaginal speculum is used to expose the lower genital tract. The condition of the labia, vaginal mucosa, and cervix is observed, and also the character, color, odor, and amount of discharge present. Specimens are taken on swabs which are passed beyond the speculum blades, care being taken not to touch the blades in withdrawing the swabs. The material is transferred to slides, for wet-mounts, Gram's and iron-hematoxylin preparations, also to culture tubes containing 8-10 ml. of flagellate isolation medium (FIM).

To obtain the wet-mount, a drop of discharge is emulsified in a drop of normal saline on a warm glass slide, and mixed. A coverslip is placed at an angle to the slide, not quite touching the drop. It is pushed along the surface of the slide until it contacts the drop, allowing some material to spread along the edge. The coverslip is then dropped on the slide. The preparation is studied under low and high dry objectives. One drop of 0.10 per cent safranine in normal saline is sucked under the coverslip.

To obtain a Gram stain smear, another drop is emulsified in saline and the mixture spread over two-thirds of a slide, the smear being dried and fixed as usual. The Hucker modification of the Gram stain is excellent. This smear excludes gonococcal infections; it is followed by culture on chocolate agar. Oxydase test and fermentation subcultures confirm growths. Stained mounts are made if wet-mounts show no flagellates. Faust's iron-hematoxylin staining method (1942) is used, preceded by wet fixation in Schaudinn's sublimate.

For culturing vaginal discharges of trichomonads, a medium consists of a 2:3 serum-Ringer's solution with an equal part of 1 per cent enzymatic yeast protein hydrolysate ("prominogen") containing added agar, carbohydrates, and liver extract. A sterile swab with the discharge material is placed in 10 ml. of FIM-hydrolysate medium in a plugged 20 by 150 mm. culture tube. In collection, this swab is moistened with the medium and passed through the speculum. After the material is collected, the swab is replaced directly in the tube of medium. The specimen is mixed with the medium and incubated for 24 hours at about 37.5°C. A drop of sediment at the bottom of the medium is removed with a wide-mouthed bulb-type pipette. This is prepared as a wet-mount and examined for trichomonads. If negative the tube is incubated another twenty-four hours, gently shaken and rotated to mix the sediment with the fluid, and the entire contents are transferred to a 15 ml. centrifuge tube and centrifuged fifteen minutes at 1,200 r.p.m. The supernatant fluid is decanted and the sediment mounted on a slide for examination. 11 references.

Gonococcal Arthritis: a Study of 202 Patients Treated with Penicillin, Sulfonamides or Fever Therapy. *Jay A. Robinson, Harold L. Hirsh, William W. Zeller and Harry F. Dowling, Washington, D. C.* Ann. Int. Med. 30: 1212-23, June 1949.

Various methods of treatment were tested upon 202 patients with gonococcal arthritis. In the presence of inflammatory rheumatism, the diagnosis was considered definite if organisms resembling gonococci appeared on smear or culture of the joint fluid. If the joint organisms were absent, the diagnosis was probable if the organisms were found in specimens from the genitourinary tract and no other type of arthritis was indicated. A positive complement-fixation test was similarly accepted as probably diagnostic. The latter test was done on joint fluid or blood in 99 patients and was positive in 81. The series studied included 109 males and 93 females. Eighty-five per cent of the cases occurred between the ages of twenty and forty in males, and between the ages of ten and thirty in females. Monarticular involvement occurred in 39 patients, and 163 had polyarthritis.

Patients with symptoms less than thirty days' duration were called "acute", and all others "chronic". Eleven patients received only symptomatic treatment. Nine recovered and 2 were discharged against advice, without improvement. These results are not truly indicative of the general efficacy of this method of therapy. Fifty-five patients were given fever therapy; the Kettering hyperterm was used in 33 patients, and 21 recovered. Typhoid vaccine was used intravenously in 22 patients, with inconclusive results since the therapy was not adequate in any case.

Sulfonamides gave favorable results in 97 of 140 patients. The duration of the disease did not have so great an effect on the outcome as did the existence of previous attacks of arthritis. Of patients with previous attacks, 43.1 per cent responded favorably, whereas 81.2 per cent without previous attacks did well. There was a definite tendency toward a progressive de-

crease in the efficacy of the sulfonamides. Early treatment was important. Recovery occurred in 82 patients treated within thirty days of the onset of symptoms, whereas 15 recovered when treated after a greater lapse of time.

Of 32 patients given penicillin, 23 recovered. Recovery occurred in 84 per cent of those who received adequate dosages. The prior attacks of arthritis had more effect on the outcome than did the duration of the present symptoms. Penicillin is undoubtedly the drug of choice. Two to 5 million units should be given over a period of five to ten days. If desired, sulfonamides may be tried first, and they should always be used in patients who do not respond to penicillin. Fever therapy is probably the most effective therapy in patients with a history of previous attacks of arthritis, but it is dangerous and should be used as the last resort. 31 references. 5 tables. 1 figure.

Genito-Urinary Aspects of Early Filariasis. *Don E. Murray, Chicago, Ill.* J. Urol. 61: 967-71, May 1949.

Early filariasis is discussed in a series of 200 soldiers who had been garrisoned close to an infested native village in the Pacific area. No case was found that had not been in immediate contact for at least six weeks, with a source of repeated inoculations. A vector distance of 500 yards was assumed for purposes of filarial control. The etiological agent was *Wuchereria bancrofti* and the vectors were *Aedes culex* and *variegatus*. Many patients were found with clinical manifestations of the disease six to eight weeks after exposure. The first symptoms consisted of mild pain, swelling, redness of an extremity, or scrotal swelling. Forty-two cases had fever, usually 99-100° F., for an average of six days. Striking features were the recurrent nature of the disease and the lack of severe constitutional reactions. A constant feature of the lymphangitis was the retrograde, or centrifugal method of spread. Sixty-five per cent had adenopathy of the epitrochlear lymph gland. All cases had inflammation of the spermatic cord, epididymis, testis or scrotum, with funiculitis and epididymitis being combined most frequently. The swelling involved the spermatic cord from the external inguinal ring to its junction with the epididymis, with a frequent concurrent swelling of the latter. Involvement of the epididymis was usually limited to the globus major. The testis was involved in 15 per cent of all cases. There were 16 hydroceles. Pain and discomfort in the inguinal region were most often nocturnal in nature.

Diagnostic methods involved white and differential blood counts, analysis of urine and sediment, stool examination, blood Kahn, and chest plate. Peripheral blood was studied by thick and thin stained smears, and Knott's concentration method. Aspirated hydrocele fluid was cultured and examined microscopically. No microfilariae were ever found in the body fluids. Tissue biopsies were made in 45 cases from inguinal, femoral, epitrochlear, and axillary lymph glands, tunica vaginalis, and epididymes.

Tissues from tunica and epididymis were negative. Lymph gland culture was negative but on stained section there was a granulomatous type of inflammation.

Differential diagnosis of genital lesions can be very difficult. Filariasis can be diagnosed on clinical grounds alone. There is no specific drug in treatment. Therapy resolved itself into symptomatic treatment with evacuation of the patient to a temperate climate. The disease will probably not become a problem for the urologist. Complications such as atypical elephantiasis is very remote. Impotency may result from involvement of the genitalia. 4 references. 3 tables.

Sulfadiazine-Sulfacetimide Mixture in the Treatment of Urinary Tract Infections. *Harry Seneca, Edward Henderson and Martha Harvey, College of Physicians and Surgeons and Presbyterian Hospital, New York, N. Y., and Schering Corp., Bloomfield, N. J.* J. Urol. 61: 1105-13, June 1949.

Sulfacetimide, sulfadiazine and sulfathiazole and 3 combinations of these were compared by tests in vitro for their effectiveness against typical organisms infecting the urinary tract.

Each compound alone seemed to have its preferential field of action, but the respective fields overlapped broadly. Mixtures preserved the range of action of the individual compounds and combined their ranges in general. The sulfonamide mixtures used included: sulfacetimide-sulfadiazine; sulfacetimide-sulfathiazole; and sulfadiazine-sulfathiazole.

The combination of sulfacetimide-sulfadiazine was the most effective. In any given case with urinary tract infection, the drugs of choice can be determined by a simple in vitro test: bacteria recently isolated from the patient's urine are grown out in broth culture for eighteen to twenty-two hours, when an inoculum of exactly 0.1 cc. of 1:100 dilution is taken for each of 16 prepared sulfonamide culture tubes. The latter are prepared in nutrient broth (Difco) by dissolving a 0.5 per cent solution of each of the 3 sulfonamides, and of the sulfacetimide-sulfadiazine mixture, with the help of sodium bicarbonate and heat and adjusting the pH to 7.4. The initial concentration (1:200) and 3 dilutions (1:400, 1:800, 1:1600) are taken, in 3 cc. amounts, pipetted into test tubes and sterilized by autoclaving. Each tube is inoculated with 0.1 cc., the rack of 16 tubes is incubated overnight, and each tube is read for turbidity, indicating bacterial growth, recording from zero (inhibition) to 4 plus.

If the test cannot be done, the routine management should consist of the sulfacetimide-sulfadiazine mixture. Favorable results were obtained in 30 cases of varied urinary tract infections; the dosage of the drug mixture was 4 Gm. total the first day, and 2 Gm. daily for ten to fourteen days.

The most sulfonamide-sensitive organisms were: *B. lactis aerogenes, S. morgani,* and some strains of *Ps. pyocyaneus;* the least sensitive included most strains of *Ps. pyocyaneus* and *S. aureus;* intermediate grades of behavior were found with *E. coli, B. fecalis alkaligenes, Proteus* and the streptococci. 35 references. 2 tables.

Streptomycin in Non-Tuberculous Urinary Infections. *Charles A. Wells and Raphael Marcus, University of Liverpool and Royal Infirmary, Liverpool.* Brit. J. Urol. 21: 68-77, March 1949.

Thirteen patients with non-tuberculous urinary infections were treated with streptomycin after all other methods of therapy had failed. Three cases which needed surgery were virtually hopeless; one with miliary tuberculosis (discovered at autopsy) died but the other two responded to treatment and underwent later surgery with success. Of 3 other cases in which infection was associated with incomplete surgical relief, 1 was not improved, while 2 showed clinical improvement but persistent infection. Of 7 other cases in which surgery had been completed but infection remained, all showed permanent improvement with some persistent infection in 2 of the patients.

Streptomycin was used only after other methods had failed, and residual infection was then found to be caused by a single organism or one organism in great preponderance. The residual organisms which were identified and found streptomycin-sensitive included: *B. Coli*, Friedlander's bacillus, *B. proteus*, and *B. pyocyaneus*. The routine procedure adopted in treatment was: (1) urinary alkalinization and restriction of fluids to 1-2 pints in one day; (2) streptomycin, 0.5 Gm. every six hours until 4 Gm. were given, and then six hours later a 1 Gm. dose; (3) penicillin, 100,000 units every six hours and continued for a further five days after streptomycin therapy was completed; (4) sulfatriad, 0.5 Gm. six-hourly and continued for a further five days after the end of the course; and (5) acidification of urine to pH 5.5 and use of sodium or ammonium mandelate for one month. Some patients received hexamandelate.

In résumé, all cases were controlled, and in most cases there were eliminated infections caused by *B. proteus*, *B. pyocyaneus*, Friedlander's bacillus, and *B. coli* resistant to sulfa drugs. The streptomycin dosage was small enough to exclude serious risk of toxic side effects. 30 references. 2 figures.

Streptomycin, an Adjunct in Surgery for Tuberculosis. *John A. Taylor, New York, N. Y.* J. Urol. 61: 806-13, April 1949.

Streptomycin was used pre- and postoperatively on tuberculous patients to reduce morbidity and prevent spread of the disease. In Case 1, a fifty-three year old Chinese male, the preoperative diagnosis was right renal tuberculosis and right epididymo-orchitis. The patient received 0.25 Gm. streptomycin every three hours to a total of 7 Gm. He had pancreatic diabetes which was controlled with diet and insulin. A right nephrectomy and orchidectomy were done; the pathological diagnosis was tuberculous nephritis, orchitis, and epididymitis, right. The operation was done in the presence of an abscess in the scrotal area and it healed per primam. Later the wound began to drain and responded to streptomycin. The disease later began to spread and was checked with streptomycin. When the patient was originally discharged on the twelfth postoperative day, he had received about 21 Gm. of streptomycin.

In Case 2, a forty-five year old woman contracted tuberculosis from her husband about ten years previously. She had pleurisy with effusion, which was drained, and she then developed Pott's disease of the spine. About three years before admission she became paralyzed from the pectoral region to the toes. A severe urinary infection occurred. A calculus was observed in the pelvis of the left kidney. The patient was given penicillin, 50,000 units every three hours, and streptomycin, 0.25 Gm. every three hours, the penicillin being increased. She improved on the thirteenth day and penicillin only was stopped. The fever rose on this regimen and penicillin was substituted for streptomycin. She had several attacks of cardiac decompensation, controlled by oxygen. She was given proteins intravenously and large doses of vitamins. She had penicillin continuously. Just prior to operation, streptomycin was given. A transperitoneal nephrectomy was done and the abdominal cavity was found to be the seat of tuberculous peritonitis. A small perinephric abscess was ruptured, and contaminated the operative field. In spite of contamination and multiple tuberculous lesions, there was speedy convalescence and primary wound healing. The pathological report was: tuberculous pyelonephritis and nephrolithiasis.

The observations suggest that streptomycin is a very useful adjunct in surgery of genitourinary tuberculosis. 5 figures.

Reiter's Disease: a Report on Four Patients Treated with Streptomycin. *Thomas A. Warthin, West Roxbury, Mass.* Am. J. Med. 4:827-35, June 1948.

Four cases of Reiter's syndrome are presented with bacteriological and electrocardiographic data for each case. In two cases pleuro-pneumonia like organisms were obtained from the urine and in one case from the knee fluid. The previous finds of Dienes and Smith and their suggestion that an etiologic relation exists between the pleuropneumonia organisms and Reiter's syndrome are discussed. In two cases electrocardiographic and cardiac abnormalities are noted and correlated with previous cardiac complications in earlier reports.

Three patients received a total dose of 4 Gm. of streptomycin and the fourth 2.5 Gm. a dose for 10 days with encouraging but inconclusive results. There was no untoward reaction and the author concluded that further use of streptomycin in Reiter's syndrome is indicated. 30 references. 2 figures.

Aureomycin: Studies on Absorption, Diffusion and Excretion. *Wallace E. Herrell and Fordyce R. Heilman, Mayo Clinic, Rochester, Minn.* Proc. Staff Meet., Mayo Clin. 24: 157-166, March 30, 1949.

A method to assay aureomycin in body fluids is described. The drug is readily absorbed systemically. The serum content quickly approaches therapeutic levels after single oral doses of .75 to 1 Gm, and is often maintained at fairly constant level for hours. Activity completely ceases after twenty-four to thirty hours; the serum content varies between 2 and 4 or even 8 micrograms per ml. Further administration does not raise the serum content.

Aureomycin appears to be absorbed and distributed in many fluids and tissues. It diffuses into cerebrospinal fluid in therapeutically effective amounts. It diffuses through the placenta, and it passes into the pleural fluid. It is excreted in the bile and in the urine. It is also found in liver, kidney, spleen and lung. 2 references. 7 tables.

Aureomycin in Urinary Infections Due to Gram Negative Organisms. *Alexander M. Rutenberg and Fritz B. Schweinberg, Beth Israel Hospital, and Harvard Medical School, Boston, Mass.* Proc. Soc. Exper. Biol. & Med. 70: 464-67, March 1949.

Aureomycin was highly effective against many strains of gram-negative bacilli (*Pseudomonas aeruginosa, Bacillus proteus vulgaris, Aerobacter aerogenes,* and *Escherichia coli*) *in vitro,* including those which were known to be resistant to sulfonamides, penicillin, and streptomycin. Various strains of a single species varied greatly in sensitivity.

Ten patients with diverse urinary tract infections were given aureomycin. These infections were refractory to previous treatment with other antibiotics. All patients had pyuria. Nine patients received aureomycin intramuscularly; the usual dose was 80 mg. every eight hours for five to six days, but acutely ill patients received an initial intravenous dose of 300 mg. in 500 cc. of saline. Aureomycin was given orally to the tenth patient, 4 Gm. the first day, 3 Gm. the second day, and then 2 Gm. daily in divided doses. There were no toxic reactions, but painful injections were managed by dissolving aureomycin in 1 per cent procaine.

Clinical symptoms cleared in every patient. The urine became sterile in 3 of 4 patients with univalent infections and in 5 of 6 patients with polvalent infections, and it remained so for seven to ten days after stopping aureomycin. In 1 case the urine was not entirely sterilized, but *A. aerogenes* was reduced sharply in numbers. In a second case *Ps. aeruginosa* was eliminated, while *A. aerogenes* was sharply reduced.

Of 20 strains of bacteria in 10 patients, all strains of *E. coli, Ps. aeruginosa, B. proteus, Strep. viridans, Strep. fecalis,* and 5 of 7 strains of *A. aerogenes* were cleared from the urine; the persistent strains were reduced in number. In all cured patients treatment was continued for two or three days after the urine became sterile; when the drug was discontinued too soon in 1 case, recurrence took place. 5 references. 2 tables.

Aureomycin Treatment of Acute Gonorrhea in Males. *Harvey Shields Collins, Helen Trousdale, Thomas F. Kaiser, Francis C. Regan and Maxwell Finland, Boston City Hospital, and Harvard Medical School, Boston, Mass.* Am. J. Syph., Gonor. & Ven. Dis. 33: 263-69, May 1949.

Aureomycin was found to be highly effective against gonococci in vitro. Weight for weight, aureomycin was much less active against gonococci in vitro than penicillin, but it was much more active than streptomycin, bacitracin, polymyxin D, polymyxin B, and sulfadiazine.

Aureomycin concentrations in excess of the largest amounts needed to inhibit any strains of gonococci tested were found to be present in the urine of normal adults for more than forty-eight hours after a single oral dose of 0.5 Gm. An activity equivalent to 64 micrograms of aureomycin per ml. of urine was present for sixteen hours after this dose. The drug in large doses orally was relatively free of toxic effects. A trial of aureomycin thus seemed indicated.

Clinical and bacteriological studies showed that oral aureomycin hydrochloride in total doses of 1.0-3.5 Gm. for twelve to thirty-six hours is an effective cure for acute gonorrhea in males. The cure rates from this treatment, with the possible exception of larger doses, were definitely inferior to those obtained from the usual doses of intramuscular penicillin. However, the present results are about equivalent to those reported for oral penicillin; the latter may be given in smaller total doses and for shorter periods. Comparison of results of parenteral therapy with aureomycin and penicillin is not yet possible since suitable preparations for parenteral administration of aureomycin in adequate amounts are not at present available. Oral aureomycin is a second choice to penicillin. It may be useful in patients who are sensitive to penicillin, or where there is a mixed infection with gram-negative bacilli, since aureomycin is effective against such organisms, except for strains of *Proteus* and *Pseudomonas*.

Because of the prolonged excretion of aureomycin, some patients who were considered treatment failures on the day after aureomycin was given would have gone on to complete cure without further treatment. Observations were not continued, however, in clinic patients who had any discharge or positive smears at any return visit, and penicillin was immediately given to these patients. 9 references. 3 tables.

Oral Aureomycin Therapy for Chancroid. Report of a Case. *Calvin H. Chen, Robert B. Dienst, and Robert B. Greenblatt, Augusta, Ga.* J. M. A. Georgia. 38: 205-6, May 1949.

Aureomycin is effective against a number of infections caused by Gram-positive and Gram-negative micro-organisms, and, like chloromycetin, against rickettsial diseases. Its range is greater than streptomycin, as, for instance, in granuloma inguinale which is known to be resistant to penicillin and even, in some cases, to streptomycin.

The patient, aged 20, and ill two months, had a positive Ducrey skin test and negative Frei and Kahn tests, justifying a diagnosis of chancroid. Aureomycin capsules were given orally, a daily dosage of 1 Gm. (250 mg. q.i.d.) for five days. Pain and soreness which caused difficulty in walking disappeared completely on the day following medication. Redness in the inguinal regions disappeared, but the swelling did not reduce until the third day, when it decreased to ½ the original size, and by this time the penile lesion healed, shedding the crust and epithelization. By the seventh day all swelling had subsided and there were no toxic reactions. Since sulfonamides require from two to three weeks for a cure of chancroid, aureomycin may be a much better substitute. 7 references.

Neomycin, a New Antibiotic Active against Streptomycin-Resistant Bacteria, including Tuberculosis Organisms. *Selman A. Waksman and Hubert A. Lechevalier, New Jersey Agricultural Experiment Station, Rutgers University.* Science 109: 305-307, March 25, 1949.

Neomycin was isolated from the soil. It is related to a culture isolated from soil in 1915 by Waksman and Curtis (1916) and called *Actinomyces fradii* (now listed in Bergey's Manual as *Streptomyces fradiae*). When the culture was grown in a medium containing a source of nitrogen, glucose, and sodium chloride, it produced neomycin under stationary and submerged conditions of culture. The antibiotic is readily removed from the culture medium and concentrated by methods of absorption and elution developed to isolate streptothricin and streptomycin.

Neomycin is basic, most active at alkaline reaction. It is water-soluble and thermostable. It is active against many gram-positive and negative bacteria, particularly mycobacteria. It shows similar activity against streptomycin-sensitive and streptomycin-resistant bacteria. It has considerable activity against forms of *M. tuberculosis.* Its toxicity in animals is limited or absent. It is active against various bacteria *in vivo.* There is lack of resistance against neomycin among organisms sensitive to it, or only limited resistance.

When a twenty-hour-old culture of *E. coli* was suspended in water and plated out in nutrient agar containing 5 μ or 25 μ of neomycin per ml., no *E. coli* colonies developed out of 22 billion cells after incubating nine days at 28 C. When agar pieces were removed from plates containing neomycin and inoculated into sterile agar plates, only the 5 μ / ml. plate gave growth from some pieces, but the 10 μ / ml. and 25 μ / ml. plates gave no growth, indicating high bactericidal potency of neomycin.

Broth or agar cultures with enough neomycin to inhibit growth of many bacteria were incubated. No further bacterial development occurred after an initial inhibiting concentration, thus indicating (1) neomycin stability, contrasted with that of aureomycin, and (2) lack of resistance developed among the sensitive bacteria, contrasted with streptomycin and especially grisein. 10 references. 4 tables.

6. Calculosis

Urinary Tract Calculi in Recumbent Patients. *James C. Kimbrough, Col., M.C., and Joseph C. Denslow, Maj., M.C., Walter Reed General Hospital, Washington, D. C.* J. Urol. 61: 837-45, May 1949.

Fifteen cases of urinary calculi occurred in the course of one year among 800 patients immobilized long periods for bone injuries. It is assumed that all calculi were formed in the kidney (or possibly the bladder) and the later location was produced by arrest in passage. Reduction of fluid intake is important in calculus formation in the recumbent patient. The exact factors are difficult to evaluate. The diagnosis was generally made by

the appearance of renal colic, lumbar pain, digestive disturbances, and by presence of blood in the urine. The first evidence was often spontaneous passage of calculi with urinary symptoms.

The shortest period for calculi formation was seventy-four days; the longest twelve hundred; the average 362 and the mean time was 272 days. Urolithiasis in most cases can be prevented by proper care of patients immobilized long periods because of bone injury. Preventive measures should be used on patients susceptible to urolithiasis. The following information should be obtained: (1) urinary roentgenography to determine the presence of calculi prior to injury; (2) excretory urogram and cystogram to detect congenital anomalies, obstruction, hydronephrosis or other conditions favoring stones; (3) urine cultures to determine infection; (4) determination of the urinary calcium excretion; and (5) serum calcium and phosphorus determination to disclose parathyroid disease.

Removal by dissolution and spontaneous passage is the choice method of treatment. Manipulation should be done with caution. If reasonable efforts at other methods of removal have failed, surgical treatment should be done without delay.

In prevention the minimum fluid intake should be 3,000 cc. daily. Stasis must be avoided. Focal infection and urinary tract infection are to be removed and osteomyelitis must be treated. There should be a high vitamin A and B diet, an acid ash diet, and a limited calcium intake. Amphogel and estrogens will increase urine acidity and decrease calcium and phosphorus output and precipitation. 16 references. 1 table.

Catheter Loop Extraction of Ureteral Calculi. *Charles Eberhart, Atlanta, Ga. and James L. Campbell, Jr., Valdosta, Ga.* J. M. A. Georgia. 38: 201-5, May 1949.

In 14 cases of ureteral calculi extraction by catheter loop, 12 were successful. The danger of rupture of the ureter attends any manipulation, and selection of safe instruments is important. The catheter loop is made of a No. 5F ureteral catheter. A pinhole is made in the wall at the 5, 6, or 7 mm. marker and a length of No. 28 gage stainless steel wire, slightly over twice the length of the catheter, is used. One end of the wire is threaded through the lumen of the catheter like a stylet. The other end is doubled back on itself and passed through the pinhole and out the proximal end. The catheter may be made to form a loop by pulling on the wire threaded through the pinhole, and this wire may be identified by tying a knot in its end after threading.

No special preparation is needed. Elimination of anesthetic is preferred, as absence of pain denotes minimal trauma. The catheter must pass the stone, preferably without dislodging it upward. Any cystoscope admitting a No. 5F catheter can be used. The catheter is straight when admitted, and, after passing the stone, it may be looped in the ureter well above the calculus or in the renal pelvis. After making the loop, it is pulled down until resistance is felt. Small calculi may be extracted under vision. If large

the cystoscope is removed from the bladder. Constant traction with a hand scale is preferred, and should be applied using a No. 50 cotton thread over the foot of the bed, making a "bucket" from a water glass with adhesive tape, and gradually adding sufficient water.

If the ureter becomes blocked, the catheter may be unlooped from around the calculus by cutting the knotted wire flush with the protruding end of the catheter and making traction on the remaining wire. The catheter may be left indwelling for drainage.

The failure in 2 cases resulted from the loop slipping off a large spindle-shaped calculus which was impacted, and from inability to make a complete loop with the catheter in a small intrarenal pelvis. Both necessitated ureterolithotomy later. 7 references.

7. Hemorrhage and Shock

See Contents for Related Articles

8. Anomaly

See Contents for Related Articles

9. Kidney and Capsules

Distribution of the Lymphatics of the Human Kidney as Shown in a Case of Carcinomatous Permeation. *Arnold J. Rawson, Philadelphia, Pa.* Arch. Path. 47: 283-92, March 1949.

Lymphatic channels were traced in a human kidney obtained at post-mortem in a case in which extensive carcinoma had markedly permeated the lymph channels. The lymphatic channels originate blindly in two areas, one being closely adjacent to Bowan's capsule, and the second beneath the mucosa of the papilla. From these origins there arise two networks which follow the arterial and venous vessels of the kidney. That network which originates in the medulla drains upward, toward the arcuate vessels. That network originating near Bowman's capsule drains in the opposite direction. The two flow together about the arcuate vessels.

There appear to be no lymphatics in the glomeruli, about the afferent arterioles, or about the intertubular capillaries. If there are such networks their caliber is too small to allow permeation by carcinoma cells. Noteworthy is the close association of the lymphatic channels and the large thin-walled veins of the outer half of the renal cortex. It is possible that these veins are expansions of the interlobular veins and their tributaries and that the closely approximated lymphatic and venous channels may form a regulatory system for fluid exchange.

The studies indicate a double lymphatic system; the greater lymphatic system, that of the cortex, accompanies a greater hemic system. The lesser lymphatic system, that of the medulla, follows the course of the vasa recta of a lesser hemic system.

The lymphatic flow appears to be in the same direction as that of the venous stream. An increased renal blood flow increases lymph output from the kidneys. The renal lymphatics may thus prevent excessive excretion of fluid or accumulation of fluid in the kidney itself. 10 references. 5 figures.

Tubular Calcification in the Kidney. *Leslie N. Pyrah, Leeds General Infirmary.* Brit. J. Urol. 21: 27-29, March 1949.

Calcification of renal tubules occurs most commonly when there is high serum calcium or profound alkalosis. In some cases calcification is associated with cell damage. The concentration of calcium ions can be locally increased within the kidney by elevation of serum calcium, as in hyperparathyroidism, or by reduction in total body tissue fluids, as in pyloric stenosis with vomiting and dehydration. After a certain value, calcium ions precipitate and come down in renal cells and tubules, usually along with phosphates. Similar precipitation occurs when the reaction in the renal tissue fluids or glomerular filtrate becomes strongly alkaline; this may be a result of generalized alkalosis, as in pyloric stenosis with prolonged vomiting, or of a local alkalinity arising from infection. In some cases of calcification there is in addition an alteration in the renal tubule cells, varying from cloudy swelling to necrosis.

In hyperparathyroidism serum calcium varies from 12.5 to 23.0 mg. per 100 ml. of blood; the incidence of calcification for this disease is unknown, but when it occurs it is seen in the cortical tubule cells. In some tubules calcified debris is cast into the lumen of the tubules and there may be calcified granular casts, while clinically, calcium casts may appear in the urine. There may also be calculus formation in the renal calyces and pelvis.

In hypervitaminosis D, a high blood calcium is the chief cause of renal calcification. It may follow overdose of cod-liver oil in children, in some cases. Calcification produced by overdose of D can be followed readily in the rat. In experiments upon rats, calcification was shown to develop in a very short time, usually in three days after applying the appropriate stimulus. In the early stages the calcification was reversible; in the rat there was no evidence of renal damage after the calcification disappeared.

Where the calcifying stimulus has acted for a long period of time, as in hyperparathyroidism, actual calculi are observed in the renal calyces and pelvis. In the rat there is evidence that in hypervitaminosis D calcified debris comes down in the tubules of the cortex first and then gradually descends to the tubules of the medulla and even to the renal pelvis.

Solitary Renal Ectopia and the Nephrotic Syndrome. *Ralph H. Kunstadter and Irving J. Shapiro, Chicago, Ill.* J. Pediat. 34: 470-77, April 1949.

Congenital ectopic kidney occurs at autopsy in about 1 to 600 or 800 patients. The actual incidence is probably higher than the autopsy incidence. Solitary ectopic kidney is very rare, but since the disease is more apt to occur in such a kidney during early life, its recognition is more likely to occur during infancy or childhood.

Ectopic kidney should be suspected if there is an abdominal mass, particularly in the lower quadrants, in an infant or child. Erroneous diagnosis can be avoided by thorough study in all instances of abdominal mass with or without urinary symptoms, and/or a pathological urine. A clinical diagnostic aid is that of palpation or massage, which often produces transient albuminuria in a patient whose urine was previously clear.

Operative intervention is usually a failure in most cases of solitary ectopic kidney, but there is always the possibility of correcting a co-existing anomaly. When anomalies of the ureter and hydronephrosis exist, exploration is justified. Kidney destruction and renal failure will occur if correction is not possible.

A case of solitary pelvic ectopic kidney in a twenty-one month old infant is presented. The infant was first seen because of the nephrotic syndrome, and later examinations revealed the ectopic kidney. The clinical findings were confirmed by surgery. There was hydronephrosis secondary to congenital angulation of the ureter and ureteropelvic obstruction. Operation proved to be a failure because of an anomalous blood supply. 6 references. 2 tables. 3 figures.

Cartilage in the Kidney. *John A. Bigler and W. Price Killingsworth, Port Arthur, Tex.* Arch. Path. 47: 487-93, May 1949.

Since 1930, cartilage was found in 14 kidneys, all of which were hypoplastic. Cartilage was not present in only a few hypoplastic kidneys studied. These islands of cartilage have never been found in the normal kidney. There was never any relation to infection. Large cysts occurred in some specimens, and there were cystic dilatation of the tubules in others. In all but one specimen, there was moderate to severe disorganization of the renal elements such as usually is seen in the hypoplastic kidney. The greater the hypoplasia, the greater the quantity of connective tissue present. In one case a miniature kidney was found which was about normal in i's formation, with normal structure except for the cartilage islands. The islands vary from large to small, they are not visible grossly, and from 1 to 8 are seen in a single microscopic section; this indicates that many islands may be present in the whole specimen. The ages of the patients varied from four days to twelve years. Kidneys of adults would probably disclose the same finding.

Seven illustrative cases are presented. The cartilage islands were small and were located in the capsule, just beneath the capsule, deep in the cortex and, in one case in fat near the hilus. The presence of islands are possibly a result of disorganization of embryonal renal tissue which occurs with kidney malformations. Cartilage was never found in a renal tumor. 9 references. 4 figures.

Microcystic (Thyroid-Like) Kidney. *Harold W. Voth, St. Francis Hospital, Wichita, Kan.* Arch. Path. 47: 293-97, March 1949.

A case of microcystic, thyroid-like kidney in a twenty-two year old Negress is presented. The patient complained of stiffness and soreness of all joints for a year with recent worsening of the symptoms. A high white count

suggested infection, and 50,000 units of penicillin were given every three hours. The patient died in apparent uremic coma two days after admission.

The Wasserman and Kline tests of the blood gave 4 plus reactions. The urine contained albumin, occasional red cells and clumps of white cells. The white count was 20,000 and the differential count showed segmented forms (67 per cent), band forms (22 per cent), and lymphocytes (10 per cent).

At postmortem the pericardial sac contained 8 cc. of serofibrinous fluid. The right auricle and ventricle were flabby. The left ventrible was hypertrophied. Each kidney weighed 160 Gm. and measured 11.5 by 6 by 4 cm. There was indistinct shallow lobulation with shallow scars. The cortex was greyish brown with honeycombed structure. The orderly arrangement of the pyramids with apices converging toward the renal sinus was slightly distorted.

Microscopically, most glomeruli had a dilated capsule. Many were set off by pericapsular fibrosis. Those surrounded by dense fibrous tissue were shrunken and there were different stages of obliteration with early hyalinization. Most tubules were large and had enormous cystlike dilatations with a single layer of flattened epithelium. Tubules without the dilatations were usually quite large, with a well defined epithelium. There were noted cloudy swelling and varying stages of degeneration of the tubules, chiefly the proximal convoluted ones. The medulla showed an increased quantity of loose vascular stroma with scattered regions of round cell infiltration and a sparse scattering of leukocytes. The connective tissue and round cell infiltration of the cortex was more diffuse, dense and prominent.

Both kidneys were of normal size and did not show the usual signs of chronic pyelonephritis, which is usually considered the cause of thyroid-like kidneys. The data indicate that not all thyroid-like kidneys can be attributed to blockage of the collecting tubules following chronic pyelonephritis; some of these kidneys may represent a congenital malformation of renal tubules. 6 references. 5 figures.

Renal Function Before and After Surgical Resection of Coarctation of the Aorta. *Jacques Genest, Elliot V. Newman, Albert A. Kattus, Bruce Sinclair-Smith and Abraham Genecin, with the technical assistance of Marion Birmingham and Margot Robinson, The Johns Hopkins University and Hospital, Baltimore, Md.* Bull. Johns Hopkins Hosp. 83: 429-38, Nov. 1948.

Seventeen patients with coarctation of the aorta of the adult type were studied for their renal filtration rate and vascular flow; postoperative studies were done on 12 of these patients. There were 12 males and 5 females. Glomerular filtration rate was determined by inulin or thiosulfate clearance. Effective renal plasma flow was determined by clearance of para-aminohippuric acid (PAH) or para-aminoacetylhippuric acid (PACA). For patients 1, 2, and 8, one injection of PACA and thiosulfate was given pre- and postoperatively. Single inulin injections were given preoperatively to cases

4, 5, and 15. Otherwise, PAH and thiosulfate were a priming dose followed by an infusion at 40 drops per minute. The blood level of PAH was kept at 1-2 mg. per cent, and of thiosulfate at 20-30 mg. per cent. All tests were done in the morning on the recumbent fasting patient. All patients were catheterized. Four or 5 blood samples and 3 to 5 urine samples were taken. After each period the bladder was washed with sterile distilled water and the washings were added to the period.

Two patients died during operation and one later. Two were not operated upon. Ten of 12 undergoing surgery had a resection of the constricted segment of aorta and an end-to-end anastomosis. Two had anastomosis of the left subclavian artery to the distal aorta.

Postoperatively the renal blood flow and glomerular filtration rate were higher, and the filtration fraction decreased. The study shows that there is usually a relation between renal blood flow and blood pressure, but the nature of the relationship is obscure. Blood pressure and renal ischemia can be completely normal after relief of the aortic constriction. Renal vascular changes and hypertension are fully reversible. It is impossible to make conclusions on the nature of the hypertension in most of the cases of coarctation of the aorta. 30 references. 2 tables. 1 figure.

The Renal Regulation of Acid-Base Balance in Man: IV. The Nature of the Renal Compensations in Ammonium Chloride Acidosis. *O. W. Sartorius, J. C. Roemmelt and R. F. Pitts, with the technical assistance of Dorothy Calhoon and Phyllis Miner. Syracuse University College of Medicine, Syracuse, N. Y.* J. Clin. Investigation 28: 423-39, May 1949.

Ammonium chloride was given to 2 healthy male adults to determine the nature and extent of the changes in glomerular filtration, renal plasma flow, and ionic reabsorption which underlie altered excretory functions in metabolic acidosis; to relate the rates of excretion of the several ions to their respective plasma concentrations and to study the time relations of the renal compensations to acidosis. One subject ingested 15 Gm. daily in divided doses for the initial two days of acidosis followed by 10 Gm. daily for three days. The second subject ingested 15 Gm. daily throughout the period of acidosis. The acute response of the kidney to acidosis was studied in 1 subject in a 12 period experiment, during which a total of 10 Gm. of ammonium chloride was ingested.

Following ingestion, plasma bicarbonate decreased in exact proportion to the increase in plasma chloride, leaving the sum of these anions unaltered. During recovery, bicarbonate increased more rapidly than chloride decreased, thus increasing the sum of these anions. The power of renal tubules to reabsorb chloride increased as the bicarbonate load in the filtrate was reduced, but the increase was insufficient to prevent chloride loss in the urine. Excess urinary chloride in early acidosis was neutralized chiefly by sodium originating from body buffers. Sodium loss caused moderate reduction of plasma sodium concentration which was limited by excretion of almost equivalent amounts of water.

Three mechanisms caused restriction of sodium loss and restoration of body buffers: (a) after ingesting an acidifying salt, the increase in chloride resorption per 100 ml. of glomerular filtrate significantly decreased loss of fixed base; (b) increased calcium and potassium excretion on the second and third days of acidosis allowed decrease in sodium excretion although total fixed base loss increased; (c) ammonia and titratable acid production increased progressively during acidosis, allowing continued acid excretion with reduced loss of fixed base. A lag in return of ammonia to normal during recovery caused overcompensatory increase in plasma sodium and bicarbonate.

Although glomerular filtration rate and renal plasma flow varied opposingly in both subjects during acidosis, sodium, potassium and chloride balances followed a similar pattern. Chloride resorption increased and sodium and potassium resorption decreased per 100 ml. of glomerular filtrate. Despite lesser absorption and greater excretion, plasma potassium was held fairly constant, indicating release of intracellular potassium. Phosphate was also released from cellular or bony stores.

Changes in electrolyte pattern were studied during acidosis in acute experiments. Ammonia and titratable acid excretion increased at equivalent rates and to about the same degree in the first two hours after ingestion of acidifying salt. Only a small fraction of the maximal rate of ammonia formation, however, is reached in this time. The explanation for delay in reaching maximal rate of ammonia excretion early in acidosis and persistence of high rate of excretion in the recovery is unknown. 36 references. 2 tables. 6 figures.

Fatal Toxic Nephrosis Following the Administration of Mercurial Diuretics. *Michael S. Bruno, Bellevue Hospital, New York, N. Y.* New England J. Med. 239: 769-73, Nov. 18, 1948.

Fatal toxic nephrosis from mercurial diuretics is rare. There are 5 groups of toxic reactions: local reactions; allergic reactions; sudden death; reactions from the diuretic response; and mercurialism. Local reactions have occurred after intramuscular injections and include: burning, smarting, erythema, local histamine-like reactions, and occasional sterile abscess. Allergic reactions may be mild or severe. Sudden death has occurred only after intravenous injection, and appears to be a result of ventricular fibrillation. The diuretic reaction is a valuable tool. Mercurials are the most potent and effective diuretics. The urine excreted has a chloride ion concentration much greater than that generally present, and there is a decrease in serum chloride concentration. With profuse diuresis there appear symptoms related to electrolyte depletion. Dehydration may occur despite presence of peripheral edema. Another reaction is digitalis toxicity because of its mobilization from extracellular fluid by the mercurial diuretic. Poisoning from the mercury ion per se after parenteral use of organic mercurial diuretics is rare. Inorganic mercurials, like bichloride of mercury, most frequently produce mercurialism. The toxic signs are referable to the kidney

and gastrointestinal tract. Mercury produces a toxic nephrosis in the kidney, the damage being localized to the tubules. Organic and inorganic mercurials produce the same signs and symptoms. Damage sufficient to cause anuria, uremia and death is rare.

An illustrative case in a forty-nine year old woman is presented. A fatal toxic nephrosis followed administration of multiple intramuscular doses of mercuhydrin.

It would be unwise to discard or limit the use of mercurial diuretics because of an occasional toxic reaction. Dilution of a single dose or slowing of injection time does not reduce the incidence of toxic symptoms. The mercurial diuretics should not be given intravenously, except for severe congestive failure with acute pulmonary edema where time is of utmost importance. A small test dose should be given on the first injection; if allergic response occurs, the diuretic should be changed to another drug of the mercurial group. 18 references. 2 figures.

Salt-Losing Nephritis Simulating Adrenocortical Insufficiency: Report of a Case. *Wilbur H. Sawyer and Chester Solez, Veterans Administration Hospital, Togus, Maine.* New England J. Med. 240: 210-15, Feb. 10, 1949.

A fifty-three year old man complained of weakness, weight loss, and frequent postprandial vomiting. He had mild diurnal frequency and nocturia for several years. He had been treated elsewhere on several occasions for a bleeding duodenal ulcer. His red cell count was 2,800,000, hemoglobin 8.7 Gm., white count, 10,000 with 59 per cent neutrophiles. The NPN was 159 mg. Intravenous pyelograms showed no diodrast excretion. Barium films showed moderate pyloric obstruction. To control vomiting, suction was undertaken with a Levine tube. Dextrose and saline, plasma and whole blood were given intravenously for two weeks. The patient became relatively asymptomatic. He was on a bland diet and on alkali.

Two months after admission he experienced repeated vomiting. The NPN rose to 100 mg. and the blood chloride was 429 mg. per 100 cc. The skin was diffusely tanned. Addison's disease was provisionally diagnosed. The patient was given sodium chloride, adrenocortical extract, and DOCA. The blood pressure immediately rose and there was marked subjective improvement. Over the next ten days nausea and vomiting returned and the blood pressure fell sharply. Improvement occurred again with intravenous adrenocortical extract and sodium chloride. It was then suspected that the patient might have a salt-losing nephritis, and DOCA was discontinued. The patient felt well on oral sodium chloride and sodium bicarbonate. An attempt was made to determine whether the kidney itself was unable to respond to DOCA. It was found that body weight and blood pressure were not greatly influenced by the drug. The patient was discharged with the advice to take 5 Gm. of salt and 15 Gm. of sodium bicarbonate by mouth daily. The discharge diagnosis was: salt-losing nephritis and chronic duodenal ulcer, with partial obstruction. Four months later the patient experienced hematemesis and melena. Transfusions were given and a subtotal gastrectomy performed.

Signs of pulmonary edema developed postoperatively, the NPN rose to 150 mg. per 100 cc., and the patient died.

Postmortem corroborated the diagnosis of chronic duodenal ulcer and renal disease without Addison's disease. There were extensive deposits of calcium in the lungs, kidneys and pancreas, and in the media of the arteries, including the coronary arteries. Death was precipitated by acute gastrointestinal hemorrhage, the emergency operation and multiple transfusions. The duodenal obstruction contributed greatly to the salt, especially chloride, loss. The patient only once showed abnormal formed elements in the urine, and there was never albuminuria. The findings were consistent with a severe chronic glomerulonephritis, and no specific tubular lesion was demonstrable. Autopsy showed a fairly marked hyperplasia of the adrenal cortex. The adrenal glands had appeared normal clinically since there was no hypoglycemia and a normal intravenous glucose tolerance test. The water diuresis test had been positive for Addison's disease so that the test was not diagnostic in this condition. Manifestations of tubular inability to reabsorb water as well as salt were present. 20 references. 2 figures.

The Physiology and Clinical Significance of Reno-ureteral Colic. *Ralph A. Downs, Mobile, Ala.* South. M. J. 42: 180-86, March 1949.

True visceral pain in the upper urinary tract is caused by distention of the hollow drainage system or by stretching of the renal capsule. The former is produced by obstruction, and the latter by increase in size of renal parenchyma. In 43 cases of colic studied, 40 were caused by urinary disease and all were the result of obstructive or potentially obstructive lesions of the drainage system. In the 43 cases, pain was always referred to cutaneous areas falling within the dermatomes of the twelfth thoracic, first and second lumbar nerves. True kidney pain was referred along cutaneous nerves originating from the twelfth thoracic and first lumbar spinal nerves, while pain from ureteral lesions was referred over nerves originating from the first and second lumbar nerves. Ureteral pain was never referred to areas supplied by the twelfth nerve, and kidney pain was never referred to areas supplied by the second lumbar nerve. This observation is of clinical value. Testicular pain was found to indicate either kidney or ureteral changes in a case of urogenital disease, but it occurred three times more often with ureteral lesions than with kidney lesions.

Extra-urinary lesions can produce pain identical to or similar to reno-ureteral colic. This is because several visceral organs send afferent fibers to the same spinal segments as do the kidney and ureter; pain in these organs is referred over the same cutaneous nerves. Intra-abdominal disease is often confused with reno-ureteral lesions. The diagnosis of appendicitis may be made falsely in the presence of urinary disease.

Extra-urinary lesions may cause colic simulating reno-ureteral colic by central irritation of the spinal cord at the twelfth thoracic, first and second lumbar segments. Any lesion at this level can produce pain referred along the cutaneous nerves of the corresponding nerve trunk; the most common cause of such reference is tabes dorsalis.

Extra-urinary lesions can simulate reno-ureteral colic by peripheral irritation of the twelfth thoracic, first and second lumbar nerves. This produces a segmental neuralgia and is seen as a region of spontaneous pain and tenderness confined to the cutaneous area innervated by the affected nerve. Upper respiratory infections most commonly cause segmental neuralgia.

Two illustrative cases are presented. 8 references. 2 tables. 3 figures.

Renal Failure in Embolic Glomerulonephritis as a Complication of Subacute Bacterial Endocarditis. *Saul Boyarsky, Jack M. Burnett and W. Halsey Barker, Johns Hopkins Hospital, Baltimore, Md.* Bull. Johns Hopkins Hosp. 84: 207-15, March 1949.

A case is presented of a sixty year old man with subacute bacterial endocarditis implanted upon a congenitally deformed mitral valve, with multiple embolic phenomena and uremia because of focal embolic glomerulonephritis. The unique features of the case included an absence of fever, absence of hypertension in the presence of distinct renal failure, and severe uremia resulting from focal embolic glomerulonephritis.

The patient complained of progressive weight loss for six months and he had been diagnosed elsewhere as having gastric carcinoma. The weight loss was originally accompanied by slight exertional dyspnea and ankle edema. Nocturia developed and vision started to fail. There were many petechiae found on examination over the back, extremities and abdomen. The skin showed prominent loss of subcutaneous tissue. The muscles were atrophic and atonic. Blood pressure was 90/70, 130/90, and 110/80 on 3 occasions. Temperature was 97 F. There were scattered hemorrhages in both retinas. The chest was markedly emphysematous. The heart was slightly enlarged to the left. A loud, coarse systolic murmur was audible at the apex. The peripheral vessels were hard and tortuous. There was marked emaciation. Intravenous pyelography showed poor visualization and filling of the upper urinary tract. Cystoscopy showed contraction of the vesical neck, hypertrophy of the trigone, and trabeculation of the bladder. Retrograde pyelography only on the right revealed flattening and expansion of the minor calyces compatible with the shortening and flattening of the pyramids in chronic pyelonephritis. The patient was continuously afebrile but did not improve. On the fifth hospital day the NPN had risen to 173 mg. per cent. The presumptive diagnosis was chronic pyelonephritis with uremia. Because of anemia, purpura, and uremia in the absence of hypertension, multiple myeloma was considered. The heart murmur was thought to be a result of calcification of the mitral valve with organic insufficiency. On the tenth day the patient developed signs of a cerebrovascular accident and died the next day.

The postmortem findings included: congenital malformation of the mitral valve; patent ductus arteriosus; bacterial endocarditis; emboli and minute infarcts in the myocardium, spleen, pancreas and brain; mycotic aneurysms in coronary, pancreatic and cerebral arteries; petechial hemorrhages in various areas; embolic glomerulonephritis; septic choroiditis;

hyperplasia of bone marrow; purulent bronchitis and lobular pneumonia; partial optic atrophy; atrophy of testes; calcified nodules in the lungs, hilar lymph nodes, and liver. 21 references.

Acute Renal Insufficiency Due to Lower-Nephron Nephrosis. *Maurice B. Strauss, Cushing Veterans Administration Hospital, Framingham, and Harvard Medical School, Boston, Mass.* New England J. Med. 239: 693-700, Nov. 4, 1948.

In lower nephron nephrosis, patients often develop nausea, vomiting, weakness, malaise, occasionally pain in the abdomen or back, and abruptly or insidiously, oliguria or anuria. After renal shutdown, edema generally develops, the blood pressure rises, NPN rises, acidosis occurs, and death follows from pulmonary edema, or seldom, from potassium intoxication. Liver damage may also occur. About fifty per cent of the deaths fall within the first six days. The level of blood nonprotein nitrogen bears little correlation with the outcome. Potassium intoxication may be important as a cause of death when it produces alterations of cardiac function. The damage is not always irreversible, and regeneration of the tubular epithelium may be anticipated in most cases within the first two or three weeks if the patient can be maintained long enough for healing to begin. Complete restoration can take place within several months. Available data indicate that man may survive without renal function for four or more weeks, if excessive fluids are not given parenterally.

The treatments proposed for this condition are reviewed; there is no evidence that any of them accelerates the appearance of spontaneous diuresis. A regimen is proposed which should in many cases allow the patient to survive long enough to have spontaneous recovery. If shock or dehydration is initially present, plasma or saline is used. When the urine volume is greatly decreased or anuria has begun, 750 cc. of 15 per cent glucose in distilled water is given each day intravenously, and slowly. Nothing is given orally. To compensate for significant vomiting, the amount is measured and that much physiological saline is added to the daily infusion of sugar in water. It is important in the second week not to load the patient with large volumes of intravenous fluid. In case of acidosis, 1 liter of 1/6 molar sodium lactate is given. Electrocardiograms are made on alternate days to check on potassium excess. When diuresis appears in the second or third week, a volume of water is administered enough to make up for the total urine volume in addition to 1000 cc. for all other losses, plus the amount of sodium chloride found in the former day's urine. Anemia is treated with matched blood. Seven illustrative cases are presented. 8 references. 3 figures.

Hyperchloremic Acidosis and Nephrocalcinosis: the Syndrome of Pure "Lower Nephron" Insufficiency. *Ezra M. Greenspan, Washington, D. C.* Arch. Int. Med. 83: 271-91, March 1949.

The syndrome of distal tubule nephrocalcinosis with chronic hyperchloremic acidosis is considered in a forty-four year old man. The patient

was studied during periods of oral ingestion of an acid salt (ammonium chloride), a neutral salt (sodium chloride), and an alkaline buffer mixture which was later used for treatment. The most prominent metabolic disorder on admission to the hospital was severe acidosis, associated with a serum chloride value of 680 mg. per 100 cc. (sodium chloride) or 116 milliequivalents per liter. The carbon dioxide level increased slightly on a diet relatively poor in salt and chloride. An attempt was made to find whether ammonium chloride ingestion would cause chloride retention. There was a moderate fall in carbon dioxide content but no further increase in the chloride level. During ingestion of excess sodium chloride, the acidosis remained unaffected and the high chloride level increased more. The data demonstrate the failure of the normal mechanism for chloride excretion and absorption of base. This simulates the condition in diabetes insipidus.

The patient responded well to a regimen originated by Shohl (1937) to produce intestinal acidosis and humoral acidosis in treating rickets induced by acidosis or phosphorus retention. It was modified to include: restricted sodium chloride intake, daily ingestion of 120 cc. of a solution containing 16 Gm. of citric acid and 12 Gm. of sodium citrate, and 1 Gm. of calcium gluconate daily. The daily calcium excretion fell from about 400 to 150 mg. despite the fact that the acidosis, which promoted calciuria, was not entirely eliminated.

The patient always showed low normal serum calcium levels and subnormal inorganic phosphorus levels, which suggested calcium-phosphaturia and sodium-phosphaturia, based on the inability of the distal tubules to resorb phosphate and bicarbonate. The minimal osteoporotic changes after four years of chronic acidosis were not remarkable.

The chief result of the regimen including sodium citrate and citric acid was to raise the plasma bicarbonate from 30 to 45 volumes per 100 cc. and to depress the chlorides from 690 to 610 mg. per 100 cc. Most remarkable was an apparent lack of progression in the kidney lesion during three years. The citrate-buffer mixture caused sustained improvement in respect to extreme weakness and malaise. Discontinuance of therapy on three occasions resulted in prompt clinical relapse shown by polyuria, polydipsia, dyspnea, fatigue, and muscular weakness. Clinical remissions with therapy paralleled improvement in biochemical abnormalities. 28 references. 4 tables. 5 figures.

Management of Lower Nephron Nephrosis: Report of Six Cases. *William S. Hoffman and Daniel Marshall, Cook County Hospital, Chicago, Ill.* Arch. Int. Med. 83: 249-70, March 1949.

Six patients with lower nephron nephrosis from many causes were treated by a method that included a deliberate induction of edema of nearly normal electrolyte composition to dilute the accumulating intoxication products. Other measures involved keeping the patient in a good state of nutrition. The clinical pictures were similar to each other in many respects.

There was no previous history of renal or vascular disease. Five of the cases had a definite shocklike condition. Oliguria was seen in one to three days after the initial insult and persisted despite measures to promote urinary output. There was always some urine excreted; the specimens were neutral or slightly acid, had a specific gravity near 1.010 and contained a few red and white blood cells and casts. Oliguria lasted from five to thirteen days. Once excretion exceeded 500 cc. daily in adults, it rose rapidly, reaching several thousand cc. daily in a few days. There was no initial hypertension, but it rose as oliguria continued, and returned to normal after diuresis set in. Edema occurred early and was associated with rapid fall in serum proteins. In 5 cases edema disappeared rapidly with diuresis; in the sixth, a fatal case, there was terminal hydrothorax and pulmonary edema. Symptoms of uremia were slow to develop. Serum chloride and sodium concentrations were below normal despite presence of edema; the concentrations returned to normal once diuresis was established. Serum NPN concentrations leveled off in the later days of oliguria.

Five of the 6 patients recovered; the sixth died in uremia and heart failure five days after onset of diuresis. Four patients who recovered had full restoration of normal renal function. One patient, a two year old child, still had renal insufficiency four months after the onset of diuresis.

The data indicate that the major lesions are decreased renal blood flow and loss of specific function of the lower part of the nephron. Recovery is initiated by an increase in effective renal blood flow and it is maintained more slowly by improvement in specific function of the damaged tubules. 19 references. 6 tables. 2 figures.

The Use of Pyrogens in the Treatment of Lower Nephron Nephrosis. *Louis Jay Scheinman, Queens General Hospital, Jamaica, N.Y.* J. Urol. 61: 1003-09, June 1949.

In renal shutdown the theory is emphasized that decreased renal blood flow is the initiating and chief perpetuating factor of this syndrome. There is proposed a physiologic method of treatment, i.e., to increase renal blood flow by use of pyrogens. An attempt was made to reverse renal shutdown by employing pyrogens in rabbits.

Oliguria was produced in 8 rabbits with a 65 cc. intravenous injection of cold, pyrogen-free distilled water. Of the 8 rabbits, 3 were used as controls. The others were given injections of typhoid vaccine. A transient hematuria occurred in all. The amount of vaccine needed to produce a pyrogenic reaction was satisfactory using 10 million bacilli in 1 cc. of solution.

The decreased urinary output in all rabbits by water injection persisted in 2 controls for four days, and in the third control for three days. The first rabbit treated with pyrogens (injection at 24 hour intervals, beginning at 24 hours after onset of oliguria) showed an oliguria for five days. In the other four rabbits, treatment was begun 18 hours after onset of oliguria and

repeated at 12 hour intervals. Normal output was restored in all these four cases by the forty-eighth hour after injection of the hemolytic agent. 17 references. 4 figures.

The "Trueta" Renal Vascular "Shunt". An Experimental Demonstration of Neurovascular Control of the Renal Circulation in the Rabbit, Cat, Dog, and Monkey. *Willard E. Goodwin, Robert D. Sloan and W. W. Scott, James Buchanan Brady Urological Institute, Johns Hopkins Hospital, Baltimore, Md.* J. Urol. 61: 1010-27, June 1949.

Trueta's hypothesis of a renal vascular "shunt" mediated by the sympathetic nervous system is discussed, and experiments to prove or disprove the concept are described. Forty rabbits, 40 dogs, 4 cats, and 4 monkeys have been studied. In the most recent experiments, Faradic current was applied from a thyrotron stimulator to the peripheral ends of the dissected and divided plexus of nerves originating in the greater and lesser splanchnics and surrounding the renal artery. The renal circulation was estimated by any of 3 ways: (1) direct observation of kidneys for cortical blanching; (2) injection of a vital dye or India ink; or (3) x-ray visualization of the vascular system which is filled suddenly with thorotrast. At the close of the experiments, bilateral simultaneous nephrectomy was done in many cases, sometimes without ligation of the pedicle. Anatomical dissections were done on all the animals, some anesthetized and some dead.

In tourniquet application or electrical stimulation of the central end of the divided sciatic nerve (15 rabbits and 10 dogs), a unilateral cortical renal ischemia occurred only once. In several instances there were bilateral totally or partially ischemic kidneys, some with the cortex being the more ischemic. In several rabbits, where, after laparotomy, the sciatic nerve was stimulated while the kidneys were directly observed, a transitory cortical blanching of the kidneys was seen, first unilateral, and then bilateral. The failures in such experiments may result more from faulty technic than from failure of the neurovascular reflex mechanism.

In 2 x-ray dog experiments where stimuli were given directly to supradiaphragmatic splanchnics, there was definite cortical blanching. The unilateral effect was obvious in 1 dog particularly.

The most consistent results were obtained in rabbits, dogs and cats by dissection of renal nerves from the greater and lesser splanchnics which were divided and stimulated peripherally. This produced a marked visible unilateral cortical ischemia which reversed with cessation of stimulus. By injecting dye directly after, renal ischemia, which was almost always cortical, was readily demonstrable. Similar results were obtained in 4 monkeys.

The experiments demonstrate a neurovascular control of renal circulation. There is renal ischemia under conditions of renal nerve stimulation. Ischemia appears first in the cortex. With prolonged intense stimulation the kidney becomes totally ischemic. It is uncertain as to whether this represents a shunt, as described by Trueta, or a progressive vasoconstriction of the

renal vascular system. The evidence indicates that the renal medullary vascular pathway assumes the chief burden of renal circulation under certain conditions, leaving cortical circulation and the bulk of the glomeruli ischemic for the duration of stimulation. 37 references. 8 figures.

Anuria Following Ischaemia of the Renal Cortex. *Adalbert Solymoss, Szombathely Hospital, Hungary.* Lancet 256: 957-59, June 4, 1949.

A case is reported of a 34 year old pregnant woman in which ischemia of the renal cortex caused anuria with eclampsia. There was no pathologic change in the urine three weeks before delivery. The blood pressure on examination was 210/100, pulse rate 80, and temperature 97.6° F. The urine contained albumin and some blood. An eclamptic attack occurred during labor and was followed by a short coma. A healthy female baby was born during a second attack, one-half hour later. After an additional half-hour there was a third attack followed by unconsciousness and then somnolence. The urine flow gradually ceased. There were continuous spasms and mild tenderness over the lumborenal region. Cystoscopy showed a few drops of turbid urine in the bladder. The ureteric orifices were mildly swollen. The patient died despite treatment with transfusions and paravertebral injections of procaine to both splanchnic regions. The clinical diagnosis was eclampsia with anuria and uremia.

Necropsy showed complete ischemia of the renal cortex and great hyperemia of the medulla. The anuria was apparently caused by diversion of blood from cortex to medulla. There were no signs of cortical necrosis despite cortical ischemia. Diversion of blood flow to medulla was identical with Trueta's results in animal experiments (1947). The same mechanism of blood diversion probably exists in the human kidney. 10 references. 2 figures.

Kidney Substitutes in Uraemia: the Use of Kolff's Dialyser in Two Cases. *R. A. Palmer and P. S. Rutherford, Vancouver, British Columbia.* Canad. M. A. J. 60: 261-66, March 1949.

Experience in 2 cases with the use of Kolff's dialyser as a kidney substitute is presented. In Case 1, a 23 year old woman, there was severe bilateral necrosis of the kidneys, but postmortem findings indicated enough remaining viable cortical tissue to allow considerable return of renal function. She appeared to be doing well until her sudden death on the eighteenth day of the disease, which emphasizes the precarious position of these patients unless the uremia is quickly relieved. Two periods of dialysis were well tolerated and produced symptomatic improvement along with measurable effects on the retained nitrogen products. An increasing diuresis followed the second dialysis. A high blood sugar during the second dialysis caused no ill effect. Renal decapsulation was ineffective.

In Case 2, a 36 year old woman, the patient received a blood transfusion prior to the onset of anuria but there was no evidence of incompatibility and the kidney failure was probably caused by incomplete bilateral

cortical necrosis. Conservative treatment for 9 days was unsuccessful. Dialysis relieved nitrogen retention and there was eventual complete clearing of uremia and water retention. Whether the diuresis is attributable chiefly to dialysis is uncertain, owing to spontaneous diuresis in these cases. A raised blood sugar and induced hydremia may have contributed.

Dialysis is indicated in any severe renal failure when it seems that the kidneys may regain adequate function in a small time. It is difficult to say how soon the method should be employed in any given case. The method is well tolerated by seriously ill patients and produces no immediate significant upset. The greatest risk involves aggravating a disturbed water balance but this is usually greatest late in the disease. The patient should not be overhydrated. The method carries the risk of hemorrhage from heparinization or from an accident at the arterial connection. The risk of infection is negligible. 34 references. 2 figures.

Management of Acute Renal Failure. *I. Snapper, Mount Sinai Hospital, New York, N. Y.* Bull. New York Acad. Med. 25: 199-227, April 1949.

It is of considerable importance to treat anuria in acute glomerulonephritis and in lower nephron nephrosis. There is a spontaneous tendency to heal in acute glomerulonephritis, and tubular regeneration in lower nephron nephrosis always begins after 10 days have passed. Every measure must therefore be taken to assure survival of the patient for 10 to 14 days after the anuria has begun.

The chief measure in management of acute anuria is reduction of fluid intake and of electrolytes and proteins. The daily fluid intake should in general not exceed 800 cc. This amount compensates for water loss through the respiratory tract and skin. The fluid intake must be increased if there is diarrhea or vomiting. For a short period a diet of 800 cc. of fruit juice can be employed. The caloric intake should be enriched by ingestion of fats and carbohydrates. A diet consisting of 200 Gm. of butter and 200 Gm. of sugar has been advocated to prevent formation during hunger of extra urea and other nitrogenous metabolites. However, this diet is highly unpalatable to most patients. Intravenous injections of large volumes of fluids and salts are contraindicated in most instances of anuria. Sodium chloride should be given for hypochloremia, and bicarbonate for acidosis.

In some patients more drastic measures are needed. This is true when the patients have been treated with large amounts of fluid and salts. The management of such patients involves such methods as the artificial kidney, peritoneal dialysis, intestinal irrigation and exsanguinotransfusion. All such drastic methods have disadvantages and should be used only when other methods fail. There is no method which allows satisfactory intestinal irrigation and prevents dangerous changes in the blood electrolyte level. 49 references. 14 tables.

The Treatment of Acute Anuria: with Evaluation of Peritoneal Lavage. *Irving A. Fields, Helen Eastman Martin, D. G. Simonsen, Maxine Wertman and Leola Westover, Los Angeles, Calif.* Ann. Surg. 129: 445-62, April 1949.

Six patients with anuria due to potentially reversible tubular lesions were managed with peritoneal or gastric lavage. Three of the patients died. Another patient who died of an acute glomerulonephritis was treated with peritoneal lavage. Those who survived probably did so independently of peritoneal or gastric lavage. The cause of death in all patients was acute pulmonary edema; at some stage 6 of the 7 patients developed generalized edema. These data emphasize the need for rigid restriction of fluid and salt.

The technic in six cases involved placing a dePezzar catheter under local anesthesia in the upper abdomen, and guiding the outlet Chaffin tube into the pelvis by a uterine sound. One limb of the Chaffin tube was connected with rubber tubing and drainage done by gravity; the other limb was clamped off. The wounds around each tube were closed with interrupted sutures. One liter of irrigating fluid was run in every 45 minutes; the fluid composition was similar to that of Fine et al. (1946). Blood chemistry was done daily and serial electrocardiograms were taken.

Peritoneal lavage effectively removed substantial amounts of nitrogen wastes. It helped to adjust a disturbed electrolyte pattern, especially potassium, and was an indirect means of supplying glucose. Its disadvantages were that it demanded constant and expert supervision, that peritoneal contamination occurred in nearly all cases when it was continued for more than four days, and that absorption of fluid from the peritoneal cavity occurred if intravenous fluids were given simultaneously.

Gastric lavage, used as the primary lavage method in one case, was much less effective than peritoneal lavage. Either method should be employed only if the patient shows some deleterious effects from nitrogen retention or from electrolyte disturbance, particularly hyperpotassemia. 34 references. 3 tables. 6 figures.

Renal Tuberculosis in Children. *A. B. Hawthorne and M. Siminovitch, Children's Memorial Hospital, Montreal, Canada.* Canadian M. A. J. 60: 276-79, March 1949.

In more than 57,000 pediatric admissions in 15 years, there were 9 cases of surgical renal tuberculosis. Urinary symptoms appeared in only 4 children; of the 4, all had frequency and 1 had hematuria. The other 5 cases were detected on routine urinalysis. Two of the cases had other organisms in the urine, and the symptoms were alleviated by treating the nonspecific infection; the urine became sterile on routine culture but pyuria persisted in both cases.

Three of the 9 cases were not operated on. The disease became bilateral in 2 while awaiting improvement in the concomitant bone lesions; a third child had tuberculous meningitis as well. Two of the 3 children died and the third has extensive bone and renal tuberculosis.

Two children were operated on late in the disease. One developed fatal tuberculosis in the opposite kidney. The other was given streptomycin and moogrol preoperatively and postoperatively, but the extensive lesions with caseation and cavitation were not affected.

Four children were operated on early in the disease. Two had active bone or pulmonary tuberculosis at nephrectomy. An infant with an active chest lesion is alive and well two years later. A girl with lower thoracic Pott's disease had some postoperative activation but is now doing well. Of the other 2 cases with genitourinary tuberculosis, 1 is alive and well 9 years after nephrectomy and epididymectomy. The second child had a tuberculous kidney excised, and died six weeks later of tuberculous meningitis.

It is concluded that surgical renal tuberculosis in children is uncommon. Persistent pyuria should always be investigated for tuberculosis by urine culture, guinea pig inoculation, and cystoscopic study. Directly after diagnosis, the infected kidney should be removed to prevent bilateral spread and to eliminate tuberculous foci. The use of streptomycin and moogrol preoperatively and postoperatively offers considerable hope. 7 references. 6 figures.

Urinary Tuberculosis in Children. *J. G. Yates Bell, King's College Hospital, London, England.* J. Urol. 61: 671-74, April 1949.

During the past 15 years, 41 of 785 bone and joint cases in children had renal tuberculosis and 7 of the 41 have died. There were, in addition, 5 cases of apparent primary renal infection with 1 death. The routine used is weekly examination of the urine for albumin, pus and red cells, and quarterly 24 hour specimen for tuberculosis and culture. With any sign of urinary abnormality, intravenous pyelography is done, and diagnoses considered include pyogenic infection, calculus of recumbency, and renal tuberculosis.

Urinary symptoms, such as frequency or pain, are rare but hematuria is sometimes noticed. The bladder is not involved early and is not helpful in establishing diagnosis. Diagnosis of renal infection, first noted by pyuria and albuminuria, depends on detection of tubercle bacilli and interpretation of the intravenous pyelogram. Radiologic changes range from slight spasm of ring muscles and atonia in cortical cases to fluffy calyx, excavation, hydronephrosis, and nonfunction and calcification in ulcerocavernous tuberculosis. *B. coli* infection can give a similar picture and this infection should be cured before interpreting tuberculosis into the x-ray.

Twenty-five of the 785 cases developed recumbency calculi. In most cases speed in diagnosis is unnecessary and excretion pictures can be taken over several months. The only urgent complication is pyogenic renal infection when a stone indicates rapid relief to prevent destruction.

Fourteen nephrectomies were done in 15 years, 10 for tuberculosis, 3 for a combination of stone and tuberculosis, and 1 for stone only in a presumably healed tuberculous kidney. Nephrectomy is usually reserved for unilateral surgical lesions and operation is deferred until the patient becomes ambulatory. This allows less risk of subsequent tuberculous infection and of

damaging the remaining kidney with calculi. Early interference is recommended when one kidney is functionless or the bladder is involved.

Cortical lesions need observation rather than treatment, but any such case can develop ulcerocavernous lesions. Prognosis is poor the younger the child and very poor if the bladder is involved. The gravity is increased by stone because of infection and renal damage, as well as the need for nephrotomy. Paraplegia with distended bladder is very serious. 6 references. 2 tables. 1 figure.

Pneumonephrosis: a Complication of Necrotizing Pyelonephritis. *Norbert M. Welch and George C. Prather, Boston City Hospital, Boston, Mass.* J. Urol. 61: 712-18, April 1949.

Significant urinary tract infection in diabetes is frequently overlooked through lack of symptoms. Pyelographically, necrotizing pyelonephritis can occasionally be demonstrated. A case of pneumonephrosis in a 48 year old white woman as a complication of necrotizing pyelonephritis is presented.

The patient was admitted in semi-stupor. She had known diabetes for one year and was taking 20 units of protamine zinc insulin daily. Two months previously, she had a shaking chill, a second one a month later, and a third one three days before admission. Her blood pressure was 120/80, temperature 104.2° F., pulse rate 130, and respirations 30. The tongue and mucous membranes were pale and dry, the eyeballs soft and the reflexes sluggish. There was hepatomegaly and a mass in the left flank. The urine was acid, 1.018, 2+ albumin, 4+ sugar, 2+ bile, 1.8 urobilinogen. Microscopic examination showed 3—5 red cells and numerous white cells. Blood chemistry revealed hemoglobin 10.5 Gm., red cells 2.82, while cells 6,300, hematocrit 23, P/88, L/12. Red cells were hypochromic. NPN 40, fasting blood sugar 440, CO_2 45%. The patient showed some improvement with regular insulin, parenteral fluids, penicillin and sulfadiazine therapy. Streptomycin was given because of a positive blood and urine culture for *B. coli communis.*

Cystoscopy showed no urine in the bladder and the bladder mucosa was covered with hemorrhagic spots. Retrograde pyelography showed gas over the left kidney. The right pyelogram showed irregularities of the calyces similar to those in necrotizing papillitis. Left kidney exploration was done. The renal capsule was tense and crepitant. The kidney tissue was collapsed, friable, crepitant and had no semblance of renal structure. The kidney was removed. The oliguria persisted and the patient died the next day. The postmortem diagnosis was pneumonephrosis, acute and chronic pyelonephritis. The left kidney consisted of 3 masses, all of which showed a necrotic appearance and a putty-like consistency. The larger blood vessels were the only identifiable structures. The right kidney was enlarged and its calyces contained a mass of necrotic tissue; its capsule was thickened and densely fibrotic. There was dense lymphocytic infiltration in cortex and medulla, and edema especially marked in the pyramids. The tubules were packed with clumps and casts of bacteria. 16 references. 5 figures.

Post-Mortem Compared with Clinical Diagnosis of Genito-urinary Tuberculosis in Adult Males. *E. M. Medlar, D. M. Spain and R. W. Holliday, Bellevue Hospital and College of Physicians and Surgeons, Columbia University, New York, N. Y.* J. Urol. 61: 1078-88, June 1949.

Genitourinary tuberculosis in male patients over 16 years of age at Bellevue Hospital during a 10 year period was studied by analysis of 5,424 necropsies. There were genitourinary tuberculous lesions in 3.1% of all necropsies, in 4.5% of patients with unhealed tuberculous lesions who died of causes other than tuberculosis, and in 26% of patients dead from tuberculosis. There were caseous or cavitating pulmonary tuberculous lesions in 85% of patients with genitourinary lesions. Forty-five per cent of the patients with genitourinary tuberculous lesions died from generalized miliary tuberculosis, with or without tuberculous meningitis. Lesions occurred twice as frequently in the kidney as in the prostate and three times as frequently as in the seminal vesicle or epididymis.

Genitourinary tuberculosis had a greater incidence in men under 40 years of age, but in total numbers, older men outranked those under 40 years of age. The incidence was greater in Negroes. Sixty-five per cent of renal lesions were miliary, with 98% bilateral; 52% of this group had genital lesions. Twelve per cent of renal lesions were cavitating with bilateral lesions in 58%. Genital lesions in this group occurred in all cases. Eleven per cent had no renal lesions, with the prostate involved in every case, and the other genital organs in one-half of the cases. In 63% of cases with tuberculosis of the genital system, the prostate, seminal vesicle and epididymis were all involved; in 29%, only the prostate was involved; and in no case was the seminal vesicle or epididymis alone involved. In cases with genital tuberculosis, there was bilateral involvement of the seminal vesicle in 81% and of the epididymis in 64%. There were no urinary symptoms in one-half of the cases with tuberculous cavity in the kidney. Tuberculous disease was diagnosed clinically in 80% of the cases with tuberculous lesions, but clinical diagnosis of the disease in the genitourinary organs occurred in only 18%. Advanced disease may occur without prominent urological symptoms. 15 references. 7 tables.

Aetiological and Therapeutic Experiences Concerning Kidney Stones. *John Hellstrom, Karolinska Hospital, Stockholm, Sweden.* Brit. J. Urol. 21: 9-16, March 1949.

The frequency of renal calculus in Sweden was studied. The investigation included 42,000 cases seen in public hospitals during the years 1911-38. There was an increase in cases after the first world war, but the cause is obscure. In the older records, oxalate or oxalate-phosphate stones comprised about two-thirds of the total number, whereas uric acid and aseptic phosphate stones each amounted to only 5%. Infective stones, mainly phosphates and carbonates, constituted over one-fifth of the cases. Karolinska Hospital records show a relatively large number of infective stones, but

oxalate concretions still predominate among aseptic cases. These concretions usually occurred in younger men, generally with gastrointestinal disorders. Etiologically, bacteria which decompose urea lead to formation of calculi. Bacteriologic study of concretions may show that the stone has been produced by staphylococcal infection, even though staphylococci are not detected in the urine. In concretions found in hyperparathyroidism or other diseases involving skeletal decalcification, infection plays a part.

Operations contemplated for calculi include pyelolithotomy, nephrolithotomy, ureterolithotomy, and nephrectomy. In the course of years, more conservative therapy has been advocated. For stones in the lower ureter, a midline incision between umbilicus and symphysis is made, and the ureter is exposed extraperitoneally. The risk of recurrence affects the operative technic and management of the case. The only reliable procedure is x-ray examination after a sufficient observation period. To avoid leaving stones unremoved, it is necessary to have x-ray examination of the exposed kidney at operation, to have good access to the renal pelvis, and to handle the kidney cautiously so that stones are not broken. Uric acid stones are not ordinarily seen in the usual x-ray, and at operation the calyces should always be searched for stones.

The usual oblique lumbar incision is used to expose the kidney which is exposed as little as possible, merely being rotated *in situ*. There are several stone-forming factors produced by operation. One is hemorrhage and blood clots, which demands thorough hemostasis, a good agent being 3% hydrogen peroxide. Cellular detritus and necrotic tissue are also factors, controllable by cautious but vigorous irrigation of the pelvis and by good diuresis. Risk of recurrence is greatest where the urine is infected, and infection must be combated before, during, and after operation, with sulfonamides and antibiotics. Another etiologic factor is too long confinement to bed, and patients should become ambulatory early. Control by urine and x-ray examination is necessary postoperatively, since it may be possible to have the concretions discharged spontaneously by pelvic irrigations.

There has been a considerable decrease in the postoperative mortality in Swedish hospitals. 2 references. 5 tables. 8 figures.

Bilateral Renal Calculi. *J. Thomson Tait, Melbourne, Australia.* Brit. J. Urol. 21: 17-19, March 1949.

Four cases of bilateral renal calculi are presented. In Case 1, a 52 year old man, a stone was removed from the left renal pelvis in 1936, and a stone again removed three years later. No measures were taken to prevent recurrence. In 1946, large bilateral renal calculi and a stone in the lower right ureter were found. For several months there had been dull and continuous pain in the left loin. The patient had severe rigors, and the urine contained *Ps. pyocyanea* and other organisms, for which he was given sulfamerazine and penicillin. Ten days after admission he had two attacks of colic and passed the stone from the right ureter. Pus and urinary infection persisted, but the symptoms were less severe. The blood urea was

28 mg. %. The right kidney was operated upon and a stone was delivered through a vertical incision in the renal pelvis. This was enlarged into the kidney at both poles. Two months later a disorganized left kidney was removed. The infection gradually disappeared, and the patient remained well except for slowly rising blood pressure.

The second case, a 32 year old man, had pain and swelling in the right loin and symptoms of severe urinary infection. Radiography showed multiple bilateral renal calculi. After sulfonamide therapy, the right kidney was operated upon, a cystic swelling was opened, and stones and gravel were removed. On the fourth day there was severe secondary hemorrhage, controlled with transfusion. Specimens from the left ureter and blood revealed hemolytic streptococci. The patient recovered on penicillin therapy but the urinary infection persisted. A year later the left kidney was operated upon after a preliminary course of penicillin, and stones were removed. An intravenous pyelogram three years later showed good left renal function, with some general dilatation of the calyces. In the right kidney, dilute dye accumulated in the sac, and 2 stones at the lower end showed that the cavity had contracted considerably.

In the remaining 2 cases it was believed that no benefit would result from surgery. The x-ray examination of one showed large branching calculi in both kidneys. The patient had passed stones for 15 years and complained of dull epigastric pain, but no backache. There was occasional hematuria, but he was generally well. In the other patient x-ray examination showed small multiple renal calculi; he was 50 years old, and the location of the calculi in the calyces suggested hyperparathyroidism. This patient was observed for 10 years and remained well without treatment. 5 figures.

The Urinary Citrate Excretion in Patients with Renal Calculi. *Nancy S. Conway, A. Ian L. Maitland and J. Basil Rennie, University of Glasgow and Western Infirmary, Glasgow, Scotland.* Brit. J. Urol. 21: 30-38, March 1949.

It has been suggested that a deficiency of citrate excretion by the kidney is an important cause of formation of renal calculi. The present report considers critically the merits of this hypothesis. Estimations were made on the urinary calcium, citrate, and pH in control subjects and in patients with calcium calculi. Urinary phosphorus was measured as it is a component of many calcium stones. Both controls and patients were confined to bed and given the same diet for at least 12 days. The presence of calculi was proved by x-ray examination and confirmed surgically. Since some organisms split citrate, each urine was studied bacteriologically. The site of any infection was determined by studying separately urine from the bladder and each kidney (by ureteric catheterization). The citrate content of blood and urine was measured by the colorimetric method of Pucher, Sherman, and Vickery (1936), adapted for use with the photoelectric absorptiometer. Calcium in urine was determined by the method of Shohl and Pedley (1922). Phosphorus in urine was measured by the uranium acetate method (Hawk and

Bergeim, 1938). The pH was measured by the glass electrode.

In controls, phosphorus excretion was within fairly narrow limits. Calcium and citrate excretion varied widely, but the daily output in individual cases was fairly constant. Effect of pH changes on urinary citrate and calcium output was found by first giving ammonium chloride and then sodium bicarbonate. The acid salt caused the citrate to fall and the calcium to rise, while alkali had the opposite effect.

In patients with calculi, the average citrate content of the urine, as determined in 7 patients with calculi and a sterile tract, was comparable with that observed in controls. Seven patients with calculi associated with infection were all observed to have less citrate in their urine than normals. Experiments *in vitro* confirmed that in this latter group citrate was destroyed especially by *E. coli*, but this splitting action was not detectable with Koser's medium. No hypercalcinuria was found, and the urinary pH, except for infected cases, was normal. The results fail to confirm the hypothesis that deficiency of citrate excretion by the kidney is an important factor in the formation of renal calculi. It is suggested that any gross decrease of urinary citrate is produced simply by infection of the urinary tract. The findings confirm this suggestion. 19 references. 5 tables. 2 figures.

Thoraco-abdominal Nephrectomy for Large Kidney Tumors. *Richard Chute and Lamar Soutter, Massachusetts General Hospital, Boston, Mass.* J. Urol. 61: 688-96, April 1949.

A thoraco-abdominal technic of nephrectomy is presented. It affords wider exposure of the kidney and pedicle region. This permits less manipulation before the renal vein and vascular pedicle are ligated, allows greater ease and safety in securing the pedicle vessels, gives a better cancer operation because the adjacent lymph nodes can be removed *en bloc* with the tumor, and affords better ability to remove some advanced tumors with extension to lymph nodes, which would be inoperable with narrower exposure. Less depth and amount of anesthesia are used than by operation through an abdominal incision.

Under intratracheal oxygen-ether anesthesia, and with a stomach tube in place, the patient is placed on his side. An incision is made from the lateral border of the rectus at the umbilical level, running laterally, upward and posteriorly over the eleventh rib to the spine. The incision is deepened through the muscle layer to the rib which is entirely removed subperiosteally, resection being between its posterior angle and the spine. The pleural cavity is entered through the periosteal bed. Any adhesions between parietal and visceral pleura are separated. The lung is maintained almost completely expanded. The left phrenic nerve is crushed where it leaves the pericardium. The diaphragm is then incised in line with the original skin incision, avoiding the spleen, which may adhere to its under side. The diaphragmatic cut is carried forward through the decussation of the diaphragm with the transverse abdominal muscle, and through the oblique muscles, opening the peritoneal cavity anteriorly. A Finochietto rib retractor separates the ribs, and the

kidney and spleen bulge up. The renal vein is dissected out almost to where it enters the inferior vena cava, and is sectioned and doubly ligated. The kidney tumor is retracted laterally and dissection is done under direct vision. The main renal artery is tied near its origin and other vessels are ligated. All nodes and areolar tissue about the pedicle or aorta are dissected away laterally and removed. The ureter is sectioned and ligated, the cut ends being carbolized. After removing the kidney, stitches reperitonealize the raw area. The peritoneal opening is closed anteriorly with a continuous suture of 0 plain catgut on an atraumatic needle. The diaphragm is sutured with interrupted heavy silk stitches. When the lung re-expands, the pleura is re-approximated with interrupted silk sutures. Muscles are closed in layers with interrupted silk stitches.

Preoperative anemia requires transfusions, as does postoperative blood loss. Oxygen is given by nasal catheter for 12-24 hours. Patients get out of bed one to two days postoperatively and go home on the tenth day. 7 references. 11 figures.

Involvement of the Renal Capsule in Surgically Removed Hypernephroma: a Gross and Histopathologic Study. *John B. Beare and John R. McDonald, Mayo Foundation and Clinic, Rochester, Minn.* J. Urol. 61: 857-61, May 1949.

Surgically removed kidneys which were sites of adenocarcinoma, hypernephroma type, were studied, with particular reference to the capsule. In all, 488 kidneys were examined and from this group 566 sections were taken.

In 488 cases the fibrous renal capsule was involved in 343 cases, with or without involvement of the perirenal fat or venous dilatation, or both; in 75 of 343 cases, only fibrous capsular involvement occurred. Fatty capsular involvement alone occurred in none of 488 cases. Peripheral venous dilatation alone occurred in 53 cases. In 92 of the 488 cases there was no involvement of the fibrous or fatty capsule and there was no involvement of the peripheral veins.

Perirenal fatty involvement or invasion with hypernephroma is not too common, and rarely, if ever, occurs except by direct extension. There was never evidence of hypernephroma in the perirenal fat without involvement of the renal fibrous capsule. Perirenal venous dilatation was common. It was usually in conjunction with fibrous capsular involvement. Fibrous tissue involvement alone was not associated with a greatly reduced five-year survival rate; certainly venous dilatation alone was not associated with a reduced survival rate. The five-year survival rate was considerably reduced when both fibrous and fatty tissues alone were involved with hypernephroma. The presence of venous dilatation along with the other two variables was associated with a greatly reduced survival rate. The same was true for venous dilatation in conjunction with involvement of the fibrous capsule alone. Fibrous tissue involvement, plus fatty tissue involvement, plus venous

dilatation was associated with the lowest survival rate. Perirenal venous dilatation is more common where there is tumor thrombosis of the renal vein and is indicative of a poor prognosis. 4 references. 2 tables. 3 figures.

Lymphoblastoma With Signs of Renal Involvement Improved by Roentgen Therapy. II. *G. W. Jones, Howard M. Odel and Walter C. Popp, Mayo Clinic, Rochester, Minn.* Proc. Staff Meet., Mayo Clinic 24: 264-68, May 11, 1949.

A 54 year old man was admitted complaining of lassitude and easy fatiguability of six months' duration. About eight months before, a severe sore throat and edema of the ankles, hands and face developed. A diagnosis of nephritis was made elsewhere, and the patient was given a high-protein, low-salt diet with limited fluids, and edema disappeared. He stated that he had enlarged axillary lymph nodes for five years. His blood pressure was 108/70 and pulse rate 80. Cervical, axillary and inguinal lymph nodes were enlarged bilaterally. The liver was enlarged. There was edema of the ankles and lower legs. Urinalysis showed albuminuria and an occasional pus cell. Study of the blood smear was negative. After excising a lymph node from the left axilla for study, the pathologic study reported inflammatory tissue with hemorrhage. Lymphoblastoma was diagnosed provisionally and the regional lymph nodes and renal regions were given roentgen irradiation. An excretory urogram was normal.

The patient returned for study about two months later, and was apparently normal. About a year later, in routine check, enlarged lymph nodes were found in the right axillary and inguinal regions, and a series of prolonged roentgen treatments was given. A year later there were enlarged nodes in the right supraclavicular and right axillary regions. Urinalysis was negative. An excised lymph node showed Hodgkin's disease of the granulomatous type. The patient was again given x-ray treatments. Two months later his general physical condition was fairly good except for one small palpable lymph node in the right axilla. He was given additional x-ray therapy to the regional nodes and renal areas. It was impossible to make a positive diagnosis of lymphoblastoma, but the clinical response to x-ray therapy, with regression of renal symptoms to normal or near normal, should justify the diagnosis of lymphoblastoma with secondary kidney involvement. 2 references. 1 table.

Mixed Hypernephroid Tumors of the Kidney (Metanephromas). *C. G. Tedeschi, W. H. Holtham and C. L. Minor, Framingham Union Hospital, Framingham, Mass., Boston University School of Medicine, and Massachusetts Memorial Hospital, Boston, Mass.* J. Urol. 61: 981-96, June 1949.

In attempting to reach a unitary concept, 4 mixed hypernephroid tumors removed at operation are compared; they show a complexity of patterns because of the presence of a variety of epithelial and mesenchymal structures in inharmonic aggregation. A fifth case fitting into the category of the so-called Wilms' tumor is also discussed in comparison.

In Case 1, the main constituents of the growth were pleomorphic embryonal connective tissue cells, lipoblastic tissue, myxomatous tissue, smooth muscle, nerve fibers and glandular tissue; the diagnosis of Wilms' tumor seemed appropriate. The tumor developed late in life and there were no urinary symptoms. In Case 2, the main features were dark granular epithelial cells, either in solid compact arrangement or as papillary formations, intermixed irregularly with spindle-shaped sarcomatous cells. In Case 3 the structure of the tumor closely resembled that of Case 2. A well circumscribed lipoblastic module in the bulk of the growth proved further the mixed epithelial and mesenchymal nature of the tumor. In Case 4, resemblance to suprarenal gland tissue was marked, but an unusual abundance of thin-walled disorderly distributed blood vessels in close connection with the tumor cells suggested an angioblastomatous growth. In Case 5, the structure of the tumor also resembled suprarenal gland tissue, but there were areas characteristic of myxosarcoma and there were thick bundles of smooth muscle.

It is suggested that the mixed hypernephroid or metanephroma and the Wilms' tumors recognize their origin from the pluripotent generalized mesoderma. The most likely factor determining the exact type of tumor is the period of differentiation in which the dysplastic process occurs in the metanephric blastema. 24 references. 5 figures.

Associated Kidney and Bladder Tumors. *Anthony F. Kaminsky, St. Vincent's Hospital, Erie, Pa.* J. Urol. 61: 997-1002, June 1949.

Multiple neoplasms of the urinary tract occur more frequently than is generally conceded. Some patients have tumors in both the kidney and bladder. The possibility of multiple growths should be kept in mind whenever a patient is surveyed for the presence of a new growth. This implies a thorough study of the entire urinary tract. For example, hematuria is not wholly explained by detection of a tumor in the bladder. The upper urinary tract should also be checked, and retrograde pyelograms made, whenever possible. Routine recheck pyelograms in the postoperative care of bladder tumor cases may reveal an undetected early upper tract tumor.

Prognosis of kidney tumors is poor and there are very few five-year cures. Successful treatment of these lesions necessitates early recognition. The combination of pain, tumor mass and hematuria should not be allowed to occur. Nephrectomy is indicated when unilateral hematuria persists, even in the absence of gross pyelographic changes; this allows discovery of the tumors while they are still localized and while complete extirpation is still possible. It is emphasized that the appearance of a tumor long after the surgical removal of a previous tumor does not prove that a metastasis or implant was overlooked or had developed later. Another primary tumor may have appeared in the interval. 6 references.

Rare Renal Ruptures. *D. A. Duckworth, St. Michael's Hospital, Toronto, Canada.* Canad. M. A. J. 60: 500-03, May 1949.

Uncomplicated rupture of kidney, so severe that operation is considered, is infrequent. In this hospital over a period of 10 years there have been 8 cases of renal injury in 6,924 urologic admissions. Of the 8, 7 had gross hematuria and 1 had microscopic blood. Two cases were in shock; one had a ruptured kidney and spleen, and the second a ruptured kidney with fractured ribs and hemothorax. One patient died. Of the remaining 5 cases with gross hematuria, this sign persisted for three to ten days.

The greatest causative agent is the automobile, followed in order by sports and falls. Since hematuria occurs in 90% of renal injuries, routine examination of urine is essential in all accidents. A diseased kidney is more liable to injury than a normal one. Apparently mild trauma may produce a rupture. Shock may be present initially, but is no index of the degree of renal damage. Some cases show a raised blood pressure for a few days. Most cases have hematuria. The most common symptoms are hemorrhage, localized loin pain and tenderness, and splinting. The best diagnostic aids are palpation and intravenous urography. Retrograde pyelography is usually unnecessary and undesirable. The severity of renal damage is not indicated by the presence or degree of hematuria, or infection. Urinary extravasation indicates severe renal damage and is a specific indication for operation. The presence or absence of a contralateral kidney should be confirmed. 14 references. 1 table.

Solitary Pelvic Ectopic Kidney. *Harold J. Cokely, Capt., (MC) U.S.N. and Robert N. Webster, Lt. j.g. (MC) U.S.N.* U. S. Nav. M. Bull. 49: 333-35, March-April 1949.

Solitary pelvic ectopic kidney is rare, only 41 cases being reported. An additional case, in a 42 year old white man, is reported. The patient was admitted with a previous diagnosis of albuminuria, which had been detected on routine physical examination. There was no chief complaint. He was asymptomatic except for fatigue, attributed to loss of sleep and nervous tension. He had lost 10 pounds in eight months, which he attributed to unattractive meals and considerable walking. The blood pressure was 138/80. There was a persistent albuminuria ranging from 5 to 80 mg. %; this was held at less than 10 mg. % on the usual hospital regimen. This was considered albuminuria of orthostatic origin; the opinion was confirmed by finding the usual kidney function tests all within normal limits.

Genitourinary study revealed the following data: (1) penile hypospadias, not disabling because of operative repair in childhood; (2) slight congenital distortion of the bladder with high implantation of both ureteral orifices; (3) single pelvic kidney. The left kidney on pyelography was located over the sacrum; (4) absence of the right kidney, the right ureter being a blind tube; and (5) mild prostatitis, which responded to massage. 5 references. 1 table. 1 figure.

Unilateral Polycystic Kidney Disease. *Gordon O. Oppenheimer and Lester Narins, Mount Sinai Hospital, New York, N.Y.* J. Urol. 61: 866-69, May 1949.

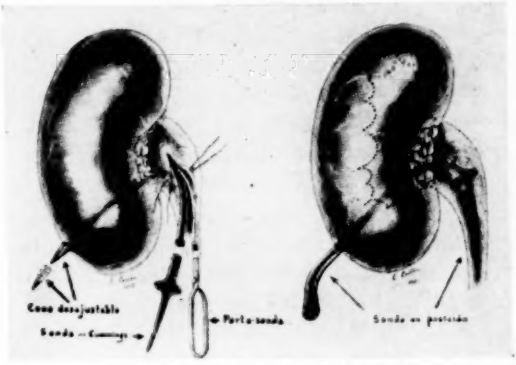
A proved (autopsied) case of a 52 year old white man with rarely found unilateral polycystic disease with contralateral hypoplasia is presented. The patient complained of nausea and vomiting for four weeks. For five years before admission he had nocturia and intermittent claudication; there was known hypertension and albuminuria. Blood urea nitrogen studies after admission showed a progressive rise from 52 to 115 mg. %. Fundus examination showed slight arterial narrowing. The thyroid was somewhat enlarged. The chest was emphysematous and the heart slightly enlarged. The blood pressure was 180/100. Urine culture yielded *S. albus B.* A urine concentration test showed a maximum specific gravity of 1014. There was mild hypochromic anemia. An electrocardiogram gave evidence of left ventricular hypertrophy.

A simple roentgenogram of the abdomen showed distinct psoas margins and no calculi. At cystoscopy, 60 cc. residual urine was found in the bladder. The bladder and ureteral orifices were normal. The right ureter was catheterized 28 cm. without obstruction; after temporary obstruction at 4 cm., the left ureter was catheterized to the pelvis, and concentrated urine was obtained. A left pyelogram revealed incomplete filling of what appeared to be a large left hydronephrotic sac. The ureteral catheter was made indwelling for drainage. Only small amounts of bloody fluid drained but there was an adequate flow of urine. The azotemia was not relieved. Four days later, pyelography on the right side outlined a small kidney with dilated pelvis and elongated calyces. The left kidney was exposed, and a large, soft kidney was seen; it was covered with many small and large cysts with the typical appearance of polycystic kidney. A left nephrostomy was done after many cysts were punctured. A biopsy of the kidney was reported as polycystic kidney with atrophy of parenchyma. The patient died five days postoperatively in uremia. The pathologic diagnosis at postmortem was left polycystic kidney and hypoplasia of the right kidney. 11 references. 2 figures.

A Simple Technique of Nephrostomy. *Alfonso De La Pena, Madrid, Spain.* J. Urol. 61: 678-79, April 1949.

The need to drain urine from the kidney pelvis cannot be overemphasized. To the present all methods of nephrostomy lack perfection, ease, and adaptability to the varying type of kidney pedicle and mobilization from the renal fossa. Introduction of an automatic retention drain is difficult and may involve damage. The "speculum" of Marion is traumatic; it often damages the arteriovenous arrangement around the kidney fornices and lacks precision. Other methods also run into difficulties.

A bullet type or pointed thimble of several sizes was devised in which the distal end of a drain catheter (Malecot, Pezzer, Cummings) may be threaded or inserted, in addition to a malleable conductor to which the appropriate form has been given. The tighter the insertion of both in the thimble, the easier the manipulation. Several sizes can be made to afford each kidney appropriate drainage. A bayonet type of attachment would give the thimble and conductor a more perfect and solid fixation. 2 figures.



Reprinted from The Journal of Urology,
Vol. 61, No. 4, April 1949.

10. Ureter

Abacterial Pyuria Producing Bilateral Ureteric Stenosis. *N. N. Gupta, King George's Medical College, Lucknow, India.* Brit. M. J. 4615: 1083, June 18, 1949.

Abacterial pyuria is a definite clinical entity of unknown etiology which should respond dramatically to injections of N.A.B. The usual picture is one of painful micturition with pyuria and hematuria and no fever in a young adult male. Cystoscopy shows an angry red mucosa which is painful.

A case in a 16 year old girl is presented. She was admitted in 1945 complaining of frequency of micturition for a few weeks. A pyrexia (100-103° F.) lasted two or three weeks. Microscopically, the urine showed traces of albumin, frank thick pyuria, and hematuria. Acid-fast bacilli could not be demonstrated. Guinea pig inoculation was negative for Koch's infection. Descending pyelography disclosed no renal or bladder abnormality. The pyuria slowly reduced with sulfadiazine and alkalies. Tests over the next three years proved that alkalies alone had this effect. For two years the patient had pyrexia with headache and the pyuria persisted with varying intensity. Cystoscopy in 1945 and 1946 showed intense cystitis. She responded dramatically at all times to N.A.B., but not to any other drug. She was given N.A.B. in 4 different courses, 3 times, 12 times, 10 times, and 12 times.

After two and one-half years of illness she felt pain in her right lumbar region which persisted for a few months and was followed by pain in the left lumbar region. Descending pyelography showed absence of renal function on the right side with hydronephrosis on the left and dilatation of the lower left ureter. In 1948 all symptoms suddenly disappeared and the urine rapidly cleared up. Pyelography showed more advanced hydronephrosis on the left side with delayed excretion after 45 minutes, and there was a kink in the left ureter. Urea concentration was 1.5 %, urea clearance 23% of normal, and blood urea 45 mg. per 100 ml. A left nephrostomy was done. The left kidney appeared normal and the slightly dilated pelvis was drained through an indwelling catheter for six weeks. This allowed recovery of renal function. A roentgenogram after injecting sodium iodide through the nephrostomy tube showed the dilated lower ureter with an obstruction at its bladder opening. After suprapubic cystostomy the stricture in the intravesical part of the left ureter was opened; the end of the right ureter was found entirely fibrosed and closed. Pyelography three months after the second operation showed a normal left urinary tract. The blood urea was then 30 mg. per 100 ml. with urea clearance 50% of normal. 1 figure.

Empyema of the Residual Ureter. *John W. Best and John K. Ormond, Henry Ford Hospital, Detroit, Mich.* J. Urol. 61: 904-11, May 1949.

Empyema of the residual ureteral stump necessitating secondary ureterectomy is uncommon. In most instances, the residual ureter following nephrectomy causes no trouble. Obstruction to adequate drainage of ureteral contents is the chief factor in developing pyogenic infection of the residual ureter.

The most common symptom is persistent or recurrent pyuria after nephrectomy. There may be urinary discomfort varying from slight frequency to severe dysuria. Dull, recurrent lower abdominal aching or acute colic has been reported. There may be intermittent episodes of chills and fever, or even chronic debility, with a long period between the nephrectomy and appearance of atypical symptoms. Time intervals to recognition of empyema vary from three weeks to 23 or more years, the symptoms usually being manifested after one to four years. The diagnosis is suspected from the symptoms plus a history of nephrectomy, and pyuria. Diagnosis is confirmed by cystoscopic study and ureterograms.

The best treatment is total extirpation of the dilated ureter down to and including, if possible, a cuff of the bladder. This procedure is difficult where peri-ureteritis has caused marked induration and adhesions. Conservative management involves fulguration of a stenosed meatus, dilatation of strictures by bougies, and irrigation of the ureter. Three illustrative cases are presented. 13 references. 3 figures.

Partial Ureteral Obstruction: Its Effect on Urinary Excretion. *George J. Warren and Joseph M. Looney, Veterans Administration Hospital, West Roxbury, Mass.* New England J. Med. 240: 413-16, March 1949.

Quantitative analyses of uric acid, phosphorus, calcium and phenolsulfonephthalein in the urine specimens from a partially obstructed kidney and its normal mate were made. The patient, a 49 year old white man, had a unilateral ureteral stricture following a ureterolithotomy done in the presence of marked infection of the ureter and kidney above the level of an obstructing calculus. The effects of partial obstruction on urinary excretion, and changes in excretion after its relief, were studied.

A marked decrease in the excretion of all substances studied, except calcium, was observed in urine from the affected kidney. The studies were repeated following plastic repair of the affected ureter, and the wide variation in excretion between right and left kidney disappeared.

Certain conclusions are drawn. The excretion of normal urine depends directly upon the functional integrity of the tubular system. Another point is the variation in calcuim level preoperatively and postoperatively. Before operation, calcium excretion was slightly higher in urine from the affected side, but this variation decreased postoperatively. Urinary stasis is a major cause of renal calculi, which contain calcium in varying degrees. Abnormal tubular physiology may be related to the formation of renal stones. Early diagnosis and treatment of obstructing lesions may obviate the subsequent occurrence of more serious disease. 10 references. 3 tables. 3 figures.

Benign Ureteral Tumor. Report of a Case. *Lyle A. Newton, Capt. (MC) U.S.N. and William L. Huffman, Lt. j.g. (MC) U.S.N.R.* U.S. Nav. M. Bull. 49: 329-32, March-April 1949.

A 25 year old white man was admitted complaining of "kidney trouble". Two days previously, on arising, he had a dull pain in the epigastrium. This became severe and was restricted to the left upper abdomen and flank. His physician found many white cells in the urine. On admission, the patient complained of dull left flank and costovertebral pain, and mild urinary frequency. He admitted to several episodes of epigastric discomfort in the past two years similar to the present attack at its onset. There was mild tenderness to deep palpation over the left kidney and tenderness to percussion in the left costovertebral angle. There were white cells in the centrifuged urine sediment.

Intravenous urogram showed a normal right kidney and pelvis; there was moderate left hydronephrosis, but poor visualization of ureter and ureteropelvic junction. Dye was excreted equally readily by both kidneys. Cystoscopy showed a normal bladder. Ureteral catheters passed easily to both kidney pelves. Indigo carmine appeared in five minutes from the right and concentrated readily, and in twelve minutes from the left and concentrated poorly. A left retrograde pyelogram showed hydronephrosis and filling defects at and just below the ureteropelvic junction. At operation

through a lumbar extraperitoneal incision, the upper quarter of ureter was found to be dilated and contained a firm, irregular mass. The ureter was incised, and several worm-like polypi appeared, most of which had been attached just below the ureteropelvic junction. The kidney and attached ureter were removed. The pathologic diagnosis was: benign fibro-epithelial papilloma of the ureter; moderate hydronephrosis; subacute pyelitis. The patient recovered uneventfully. 7 references. 3 figures.

A Clinical Review of Ureteral Tumors. *L. Kojen and Sava Petkovic, Belgrade, Yugoslavia.* Urol. and Cutan. Rev. 53: 275-84, May 1949.

Ureteral tumors can be classified as follows: (1) Primary. This includes benign epithelial tumor, or papilloma; malignant epithelial tumor, or carcinoma; tumor arising in connective tissue; and (2) Secondary. This includes tumors caused by implantation from the renal pelvis and kidney; metastatic tumors; tumors caused by penetration from neighboring structures into the ureter.

Benign papillomata were considered in 61 cases. Hematuria and pain were outstanding symptoms. Pyelography was necessary in diagnosis. Nephrectomy was the most frequent treatment. Successful resections of the tumor with preservation of the kidney were done.

In carcinoma of the ureter, hematuria and pain are most important in 70% of the cases and tumor of the kidney in about 40%. Ureteropyelography is necessary for diagnosis. The pyelogram often shows a filling defect and dense stenosis or obliteration of the ureter, whereas dilatation is not characteristic. Urography usually reveals only a lack of function of the involved side; it may show hydronephrosis which is not characteristic of ureteral tumors. Therapy involves nephro-ureterectomy, a total one being most effective; tissue surrounding the orifice should be resected if there is doubt that the orifice has been invaded. In this operation mortality has been reduced from 24 to 3%. Exceptionally rare tumors are those arising from connective tissue. There are reported 17 hemangiomas, 7 sarcomas, 3 myomas, two endometriomas, 3 fibroid tumors and 2 mixed tumors. Symptomatology of these tumors more often points to stenosis of the ureter, while hematuria is found less often. Implantation of tumor of the renal pelvis into the lower segment of ureter is very frequent, and this explains why radical nephro-ureterectomy is done in treating these lesions. Implantations of renal tumors are rare.

Thirty-eight cases of metastatic tumors of the ureter are reported. They originate most often in the abdomen, lymph glands, prostate, and uterus. Tumors of the uterus are usually those which come into the ureter by penetration; they lack special clinical interest because of their poor prognosis. Tumors of the retroperitoneal lymph glands seldom penetrate into the ureter. 63 references. 5 figures.

Surgery of the Upper Ureter for Obstruction. *Roy B. Henline, New York, N. Y.* South. M. J. 42: 275-81, April 1949.

Ureteropelvic obstruction may be suspected from an excretory pyelogram. This visualizes delay in excreting the dye, or the presence of a hydronephrosis. The method should be supplemented with cystoscopy to determine the function of each kidney and the presence of infection. A bilateral pyelogram is then taken which generally outlines the pelvis and ureter better than the excretory urogram. A film taken 10 minutes later demonstrates the location of the obstruction and shows if the pelvis has become empty during this 10 minutes. With ureteropelvic obstruction, the ureter is generally empty and the renal pelvis partially or wholly filled. The exact cause of the obstruction is determined only upon exploring the kidney and ureteropelvic junction.

Local treatment, such as dilatation with catheters or bougies, gives only temporary relief. A surgical procedure best adapted to the particular obstruction must be applied. Plastic repair needs prolonged nephrostomy drainage and splinting of the region of repair. If neglected, urinary extravasation occurs. The most common cause of obstruction is intrinsic stenosis at the ureteropelvic junction. The Schweitzer-Foley Y-plasty is applicable in most instances. A part of the enlarged renal pelvis is resected, followed by suture of the regions to be approximated. The splinting catheter must remain in place for at least six weeks in most cases. Where possible, complete severance of the ureter with reimplantation in the renal pelvis should be avoided.

Of 52 patients with 70 ureteropelvic obstructions, 18 cases being bilateral, four nephrectomies were done and the others had plastic repair. There were urinary symptoms in 22 patients, gastrointestinal symptoms in 20, and backache and pain in 46. The urine was normal in 19 patients. The cause of obstruction was extrinsic in 2 patients, stricture was present in 44, and both stricture and bands or vessels were present in 18. Forty-five Foley Y-plastics were done, and in 29 the splinting catheter and nephrostomy tube remained in place for at least six weeks. Of the 29, 20 had good results, 4 had fair results, 3 had poor results, and 2 were not followed. When the catheter and drainage tube remained for a shorter period, the results were less satisfactory. Of the 45 cases, 20 emptied within 10 minutes after retrograde pyelogram. Two patients have since died of uremia. Eighty-seven per cent were completely relieved and 5% were partly relieved. Renal calculi developed in 5 patients. Of 13 patients with other plastic operations, only 2 had good results. Two cases are reported. 4 figures.

The Technique and Results of Ureterocolic Anastomosis by the Extraperitoneal Route. *E. W. Riches, Middlesex Hospital, London.* Brit. J. Urol. 21: 51-63, March 1949.

The chief cause of death after intraperitoneal transplantation of the ureters into the large intestine has been infection of the peritoneal cavity. This is avoided by doing the anastomosis outside the peritoneal cavity.

Any leakage then is not fatal. An extraperitoneal operation is described in detail. Preoperative preparation includes a general assessment of fitness as well as renal function tests and excretion urography. A low residue diet is given with aperients and intestinal lavage. A nightly dose of cascara is combined with paraffin emulsion (½ oz.) once or twice daily. High colonic lavage is usually done daily. Sulfasuxidine is used as an intestinal antiseptic; 60 Gm. are given in four preoperative days; an initial dose of 15 Gm. crushed in milk is followed by 3 Gm. four-hourly. The patient is asked to drink copiously.

For anesthesia, pentothal followed by cyclopropane and more pentothal are usually effective, and may be supplemented by an abdominal field block. The right side is exposed first so that the loop of colon in the true pelvis can be brought into position more easily; the left ureter will be implanted at a higher level into the sigmoid colon. The procedure on each side involves three stages: the exposure and division of the ureter, isolation of the bowel, and anastomosis and closure. Postoperatively a rectal tube is inserted and retained for about three days unless it causes discomfort and secretion is satisfactory. Isotonic sodium sulfate is given by intravenous drip to promote diuresis. Sulfasuxidine is continued for two or three days, and the diet is kept free from green vegetables. The patient is generally out of bed by the third to fifth day and ready for cystectomy in from two to three weeks if indicated. If distention occurs, a glycerin enema is given on the third day. Blood urea is determined one day postoperatively and then on alternate days for the first week.

In using the extraperitoneal operation, there were 5 deaths in 60 cases. Relief from symptoms has been very satisfactory. There has been no serious rectal incontinence and most patients hold urine for four to five hours. Foods producing much flatus are avoided. In the last 7 cases both ureters were transplanted at the same operation, with one death. Some dilatation of the kidneys and ureters follows surgery but this subsides within three months if there is no stenosis at the junction. If the wound in the colon breaks down, an early leak of urine or feces occurs. These leaks often heal spontaneously, especially if the wound is kept dry by suction, but there is liability to stenosis. Stenosis is indicated by persistent dilatation of the ureter and renal pelvis, and may lead to stone formation.

The procedure has several advantages: if a leakage occurs, there is no danger of peritonitis; there is less risk of shock, intra-abdominal complications, burst abdomen, and hernia; exposure for the actual anastomosis is better; the midline is left undisturbed for a subsequent cystectomy; and one can stop if necessary after transplanting one ureter without need to reopen the same wound for the second operation. 13 references. 23 figures.

Simultaneous Bilateral Ureterocolic Anastomosis. *B. B. Hickey.* Brit. J. Urol. 21: 64-67, March 1949.

Before surgery, intravenous pyelography is done, and the competence of the anal sphincter is investigated. The rectum is examined to exclude concomitant rectovaginal fistula, and the bowel is made clean with sulfasuxidine, 6 Gm. daily for three days before operation. Cascara is given two days preoperatively, followed by an enema the night before and the morning of the operation.

Under light nupercaine anesthesia a midline incision is made from umbilicus to pubis, the small intestines are packed off, the peritoneum over each ureter is incised and the ureters are clamped and divided very close to the bladder, the distal ends being tied with silk. The proximal ends are held with clamps and the ureters are stripped up to the pelvic brim, the blood supply being preserved. The ureters are brought to a site about opposite the sacral promontory to avoid tension. Half an inch above their ends, a transverse incision is made across the anterior surface of the colon, about one and one-half in. long through all layers except the mucous layer. The ureter ends are put aside after being wrapped in swabs to absorb urine. The seromuscular layer of the lower lip of the incision is dissected downward leaving a half-moon of mucous layer bulging up toward the operator. Two upward prolongations are made from the upper edge of the cut, again through the seromuscular coat only. They are one-half in. long and less than one-half in. from the ends. These travel in a slightly outward direction. The ureters are brought over to lie in the grooves made by the upward prolongations, and the ends are sutured to the mucous layer at the periphery of the half-moon. No. 00 catgut is used. The cut seromuscular layers of the upward prolongations are sutured over the ureters. The stitches pass through their muscular layers. Another 2 sutures bring the bowel wall over the first line of suture. Absence of constriction to the ureter lumen is checked by observing escape of urine from the divided ends of the ureters. The bowel lumen is opened by cutting the mucous layer across just distal to the attachment of the ureters, which are then attached to a generous mucosal flap. The area is cleaned with alcohol. The bowel opening is closed with interrupted sutures which pull the lower edge of the incision to the upper edge and cover the mucosal flap carrying the ureters. The suture line is reinforced by burying it with a layer of Lembert sutures. Implantation sites are covered with peritoneum. Old ureteric beds are cleared of blood clots and peritoneum closed over them. The area is dusted with sulfathiazole, and a wide rectal tube, with side fenestrations cut in it to a point just above the implantation, is passed. No drain is used. The rectal tube is anchored to the skin close to the anal margin.

Sulfasuxidine is continued for eight days, in full doses for four days, and then 3 Gm. daily. The rectal tube is removed on the seventh day. Cascara ensures good fecal movement. There may be incontinence the first two days. The procedure has been used with apparently satisfactory results in four Arab patients in an Iraq hospital. 3 references. 6 figures.

Ureterosigmoid Anastomosis by Direct Elliptical Connection: a Preliminary Report. *Reed M. Nesbit, University of Michigan Medical School, Ann Arbor, Mich.* J. Urol. 61: 728-34, April 1949.

An operation is described consisting of a modified lateral anastomosis between ureter and colon. The distal end of the ureter is split longitudinally for 1.5 cm., producing a spatulate end of the ureter. A longitudinal cut of equal length in the bowel walls allows an elliptical connection of ureter and intestine by using a single layer continuous suture which penetrates all coats of both structures and produces inversion of the mucosal borders. Elliptical attachment gives a stoma with a transverse diameter 3.1416 times the diameter of the intact ureter, and when mucosal union is completed, constriction does not occur.

One week preoperatively the patient is given a high protein, low fiber diet, and a soapsuds enema on alternate nights until return is clear up to the night before operation, 15 cc. magnesium sulfate on alternate mornings with the enema, 1 Gm. sulfathalidine four times daily, 1 multivitamin capsule daily, 1 Gm. streptomycin daily in 5 doses (starting two days preoperatively and continued to the tenth postoperative day), and 300,000 units of duracillin intramuscularly in 1 daily dose. Intratracheal ether anesthesia allows safe use of the Trendelenberg position. The right ureter is transplanted first. It is exposed by incising parietal peritoneum over its pelvic distribution, then cut above its insertion into the bladder. The distal ureteral stump is ligated, and the parietal peritoneal incision is closed by continuous catgut suture, leaving a small opening around the projecting ureter. The distal ureter end is slit longitudinally for 1.5 cm. A sigmoid colon loop is picked up, a favorable area selected, and a longitudinal incision 1.5 cm. long is made through all coats of the bowel. Direct anastomosis of ureter to colon is made by a single continuous line of suture penetrating all coats of both structures, inverting the mucosal edges. Suturing is begun at the distal end of the slit ureter, and posterior margins are brought together first. A simple running stitch is used, with an occasional lock stitch. Five zero chromic catgut material is employed with atraumatic needle. The sigmoid is then carried laterally to the parietal peritoneum and secured by interrupted catgut stitches behind and in front of the anastomosis and for about 2 in. above and below that site. The left ureter is similarly dissected and anastomosed to the sigmoid at a higher level than that of the right ureter. The abdominal wound is closed without drainage and a large catheter is left indwelling in the rectum to allow urine flow from the bowel. The operation was done upon dogs as well as man and postoperative results have been excellent. Five patients have been operated upon. 5 figures.

Surgical Treatment of Megalo-Ureter and Presentation of an Artificial Ureter. *T. Brent Wayman, University of Cincinnati School of Medicine, Cincinnati, Ohio.* J. Urol. 61: 883-900, May 1949.

The attempt to repair an infected unilateral hydro-ureter of significant caliber is unjustifiable if the opposite ureter and kidney are normal. Unless

at least half a kidney will be saved by conservative surgery, nephro-ureterectomy is the method of choice. Plastic procedures for repair are simpler in the dilated, but not greatly elongated ureters. If compensatory hypertrophy of the intact kidney has occurred so that less than 25% of the total renal function is performed by the injured kidney, attempts at repair are unjustified. Determination of residual renal function in a unilateral hydronephrotic kidney may be difficult. Estimation of relative function after insertion of ureteral catheters is not always conclusive. Repeated catheterizations and study of relative functions are preferable to indwelling catheters, which usually cause infection. The amount of persistent renal cortex shown by the pyelogram should be considered. The final decision may depend upon gross examination of the kidney at operation. When plastic repair is indicated in both kidneys, it is advisable to do preliminary nephrostomy or pyelostomy. There should be time for the reaction in the ureter to subside before operating on the ureters. In plastic repair where there is no infection, preliminary kidney drainage is not done. In bilateral hydro-ureter, conservation of tissue is indicated where there is no tuberculosis or tumor. If there is obstruction in the lower urinary tract, relief of primary obstruction may not be curative. If the condition is bilateral, or in a solitary kidney, preliminary nephrostomy or pyelostomy, with freeing of kinks in the upper ureter, is indicated prior to plastic repair in the lower ureter. Immediate nephrostomy is essential in renal insufficiency. Plastic repair of ureters is more safely done when there is maximum return of renal function. If repair is unlikely or fails, an artificial ureter may be established by making a cystostomy and connecting the nephrostomy tube to it. The bladder must function satisfactorily before using the "artificial ureter".

Operations similar to that done by Crabtree (1937) were carried out on 3 patients. In Crabtree's method, following a preliminary nephrostomy, a resection of a longitudinal segment of a hydro-ureter was performed in a patient with a congenital single kidney, and a plastic closure was made; the ureter was not separated from its bed or shortened. Ten months later the functional result was good. In the present 3 cases cited above, the entire lower ureter was freed from its bed up to the iliac vessels; a preliminary nephrostomy was not done in 1 case. Plastic repair failed in 1 of these cases and the artificial ureter was used unsuccessfully for the past 15 months. In another case of a solitary kidney, the middle part of the ureter was resected and the two ends anastomosed. This operation failed and the artificial ureter has been functioning since 1944. Five illustrative case histories are presented. In 2 of the cases without chronic infection, the artificial ureter has been satisfactory. 4 references. 10 figures.

11. Bladder and Urachus

Treatment of Hunner Ulcer. *Tracy O. Powell, Los Angeles, Calif.* Urol. & Cutan. Rev. 53: 397-400, July 1949.

Hunner ulcer occurs almost exclusively in women and in the mobile region of the bladder. It is noninfectious. The disease is simulated by early vesical tuberculosis. Hunner's ulcer may in time be called "cystitis lymphopathia" with due regard to the pathologic lesion. A focus of infection must be considered as a potent factor in producing the condition. The disease can be explained on the basis of early chronic lymphedema with subsequent fibrosis and involvement of parasympathetic nerves producing spasm of bladder muscles. The female is particularly disposed to lymphatic stasis in the mobile portion of the bladder.

Segmental resection is excellent treatment when the disease is limited to the resectable portion of the bladder. The patients will be relatively free of symptoms for six months to one year. Usually the disease invades the bladder so that resection is impracticable. The aim of therapy is relief of symptoms. The problem is to break up a vicious cycle of nervous stimulation, vesical spasm, intramural edema, and limitation of vesical distention by fibrosis causing urinary frequency day and night. This is approached by mild desiccation of the hemorrhagic areas, as seen through the cystoscope, going well beyond the lesion. This destroys exposed nerve filaments, decreasing efferent pain impulses. Bladder distention with fluid increases intravesical pressure against the wall anteriorly and decreases the intramural edema. Distention breaks up strands of fibrous tissue which limit muscle function. Silver nitrate will distend and irrigate the bladder and have a sedative action on the afferent parasympathetic nerves in the healthy part of the bladder. A large Foley type of catheter prevents the bladder from expelling the fluid. The abdomen is massaged over the dome of the bladder. Diathermy is ineffective. The entire procedure carried out is as follows: (1) estrogens are given orally or parenterally; (2) excessive activity is restricted; (3) initial instrumental treatment is done in the hospital under anesthesia. The lesions are thoroughly desiccated; (4) dilatation is done with silver nitrate and manual massage of the bladder; (5) foci of infection are considered and elimination advised; (6) large doses of oral thiamine chloride are given; (7)histamine as well as hyaluronidase are used in a selected group of patients; (8) the Frei test is given, for occasionally it is strongly positive. 2 references. 1 figure.

Retention of Urine. *E. W. Riches, Middlesex Hospital.* Brit. M. J. 4611: 887-90, May 21, 1949.

There is often no sharp division between acute and chronic retention. Acute retention is sudden and painful. It follows congestion and is caused by cold and wet, and by alcoholic, dietary, or sexual excesses. There is a constant urge to micturate but only a few bloody drops can be expelled,

with severe abdominal pain, restlessness, sweating, and apprehension. Relief is dramatic when the bladder is emptied. In contrast, chronic retention is relatively painless. The bladder becomes gradually distended. Chronic retention is the more dangerous state of the two.

One method of treating acute retention is a hot bath and a morphine suppository. This is seldom successful in prostatic cases and is more likely to succeed in retention from stricture. Catheterization is effective, using a stiff rubber catheter of the Tiemann type. Aspiration is less likely to produce infection; a needle is inserted under local analgesia through the abdominal wall into the bladder, and urine is withdrawn. The needle should be inserted above the symphysis pubis and directed obliquely downward and backward. This can be repeated with needle insertion in a different spot. An attack of acute retention is an indication for prostatectomy.

In chronic retention the bladder should not be emptied just because it is full because of the risk of renal hematuria and suppression of urine. The principles to be followed in drainage are avoidance of sudden decompression, of urethral trauma, and of infection. Preliminary decompression and drainage may be done by urethral catheter, urethrostomy, suprapubic cystostomy, or by suprapubic catheterization. Urethral catheter is the simplest method of drainage and permits slow decompression. Renal function must first be estimated. In urethrostomy it is not easy to keep the patient ambulant. While drainage in suprapubic cystostomy is effective, decompression is not always gradual. The chief disadvantages include frequent leakage around the catheter and scarring of the operation field for prostatectomy. As a first stage of prostatectomy it has a high mortality. Suprapubic catheterization is the method of choice; it provides slow decompression, avoids ascending infection, leaves the field for the second operation intact, and there is no urethral instrumentation. In using this method for 227 cases, there were 12 deaths, none of which were from urinary infection.

A one-stage prostatectomy is applicable to many cases but there are a number of cases that will not survive it. Some of these cases with chronic retention and considerable renal damage can be saved by preliminary drainage. In an uncomplicated case, convalescence after a retropubic prostatectomy, a Harris operation with closure, or a Wilson Hey prostatectomy can be uneventful; the mortality should not exceed 5%. In preliminary drainage, the small suprapubic catheter is safe and satisfactory and does not interfere with full exposure required in prostatectomy. Where endoscopic resection is to be done, this catheter simplifies the operation, as continuous lavage can be used to clear the field of blood. Where long drainage is necessary, it offers the greatest chance of fitting the patient for operation. In bladder paralysis, it allows adequate drainage in the critical period. Its chief advantages include high insertion, an oblique track, and no leakage. 5 references. 4 figures.

Vesical Calculus in Norfolk. *J. M. Ridley Thomas, Norfolk and Norwich Hospital.* Brit. J. Urol. 21: 20-23, March 1949.

For several centuries bladder stone was known to flourish in Norfolk. In general the diet has consisted of farinaceous foods; there was very little dairy farming, and meat, cheese and milk were scarce. It has been stated that a deficient diet was the cause of stone, and that lack of milk may have been an important etiologic factor in children. There has been a considerable drop in the incidence of bladder stone in the last 30 years in Norfolk. Vesical calculus disappeared between the years 1910-30, a period in which there was a rising standard of living, recognition of adequate and balanced diet for children, and a change to mixed farming. It is thought from the data that a vitamin A deficiency is a predominating factor in children and adults. In the fourth and fifth decades there is a drop in numbers affected, but the obstructive and infective lesions here begin to play a part. The incidence is reducible by early recognition of the causative lesions and effective treatment. There is found also a considerable reduction in the number of cases in the later years of life.

At the present time only about 10% of patients with vesical calculi do not have an organic lesion in the urinary tract predisposing to the formation of calculus. Prostatic obstruction is the commonest cause of stones in the older patients, and in these cases the stones were multiple in over 60%. Many calculi have followed prostatectomy, probably because of persistent infection. 3 tables.

Transurethral Biopsy: An Accurate Method of Determining the True Malignancy of Bladder Carcinoma. *W. A. Milner, Albany, N. Y.* J. Urol. 61: 917-23, May 1949.

Transurethral biopsy, done with a resectoscope, is safe and gives adequate and accurate results. Malignant, infiltrating tumors of the bladder involve the bladder wall and it is only by removing tissue from this area of infiltration that the true degree of the malignancy can be determined. This is done by exposing the muscle layer of the bladder in doing the resection. If infiltration is deep, muscle can be exposed near the periphery of the lesion and this serves as a guide to the depth of resection throughout the remainder of the tumor. Where radium seed implantation is used, this visualization of the tumor infiltration into muscle indicates where the seeds should be implanted. In large tumors, piecees from the base of the tumor give the most accurate pathologic picture of the growth.

Morbidity is low after this operation. An indwelling catheter is used for two to four days, if the lesion is 2 cm. or more in diameter. Radical surgery can be done any time after receiving the pathologic report. The usual preparation is carried out where uretero-intestinal anastomosis and total cystectomy are advisable. In over 400 biopsies or resections done by this method, hemorrhage requiring cystoscopic control occurred in less than 2% of the cases. Rupture of the bladder occurred once. There was

1 postoperative death from coronary occlusion. The pathologic picture from tissue removed in this manner is accurate as to type of tumor and degree of malignancy. Tissue destruction from the cutting current is minimal and large pieces of tissue are available for section. 2 tables. 5 figures.

Bladder Tumors: a Clinical Evaluation of Radical Transurethral Management. *Lloyd R. Reynolds, T. L. Schulte and Howard J. Hammer, San Francisco, Calif.* J. Urol. 61: 912-16, May 1949.

A report is given of 100 patients with tumor of the bladder, of whom 27 were managed by fulguration and 73 by radical transurethral excision. Tumors recurred at the original site far more frequently after fulguration than after transurethral excision. Examination under anesthesia is recommended for accurate diagnosis of bladder tumor. A low spinal injection avoids anesthetizing the peritoneum. Rectal abdominal bimanual examination is positive if there is a firm, palpable mass with an empty bladder. It may be assumed that the bladder tumor is inoperable, but it is possible to remove all the tumor that extends into the bladder lumen. The bladder later resumes its normal function.

A high incidence of vesical neck involvement may be expected; these patients have edema, anemia, hematuria, foul infected urine, and stranguary. Radical transurethral excision is indicated, and is done in successive stages. If most of the tumor is removed, the interval between stages may be prolonged to two or three months. To avoid urethral stricture, the urethra is dilated by lubricant injection. When the resectoscope passes the meatus with difficulty, a urethral meatotomy is done. The direct vision Thompson resectoscope removes the bulk of the tumor protruding into the bladder lumen. The Stern-McCarthy lens resectoscope removes intramural tissue from the bladder wall. The latter is well adapted to remove tumor from the posterior wall; tumor involving the anterior wall is better engaged by counter pressure of a hand in the suprapubic region. Either instrument removes tumor from the vesical neck. During resection it is mandatory to use a minimum of irrigating fluid at low pressure. Removal of large infiltrating tumors produces epithelialization (or fibrosis) of the operative site, restoring normal bladder function.

One or both ureteral orifices were involved in 45% of the patients; 4 patients out of 73 developed hydronephrosis after radical excision but none required nephrectomy. Of 27 patients treated by fulguration, 11 had involvement of ureteral orifices and 4 developed hydronephrosis. There were 2 nephrectomies, 1 intestinal transplantation, and 1 cutaneous transplantation. A Foley type uretheral catheter is left indwelling one to three days and chemotherapy is given. Hospitalization averages five days after operation. Perivesical extravasation of irrigating fluid is managed by indwelling urethral catheter. For intraperitoneal extravasation, the bladder is drained suprapubically. The later management is one of repeated cystoscopic examinations. Cystoscopy should be done at three, six, and twelve months.

Because of many recurrences at the original site, fulguration is inadequate. A change from a small papillary low grade lesion to a large infiltrating high grade tumor involving the vesical neck may also follow. Fulguration is inadequate for infiltrating lesions and useless for large tumors. In transurethral excision, fulguration is used for hemostasis only. 12 references. 1 table.

Radical Treatment of Bladder Tumors by Electroresection. *Harold P. McDonald, Wilborn E. Upchurch and Clinton E. Sturdevant, Atlanta, Ga.* South. M. J. 42: 372-74, May 1949.

The first step in treating a bladder tumor is determining the location, extent and character of the lesion. If hematuria has occurred within a month or so of the first examination, chances of cure are much better than when hematuria has occurred for months or years. To determine the location of the lesion, cystoscopy may be sufficient. At times air cystograms help determine the extent and location of a tumor. Biopsy through the resectoscope or cystoscope diagnoses the character of the tumor and degree of malignancy.

All bladder tumors are potentially malignant, and may recur. Total or subtotal cystectomy has been advocated, but the authors recommend transurethral electroresection. This combines excellent vision with accuracy in tissue cutting and positive hemostasis. The difficulty in determining the depth and extent of resection for complete tumor removal is an objection to the endoscopic method. The curability depends on whether the tumor has grown beyond reach of the resectoscope loop. An important improvement in technic is the use of the cutting current to remove the tumor base and bladder muscularis beneath the tumor base. If the tumor does not extend through and beyond the muscularis, wide electroresection of a part of the bladder with the base of the tumor offers a good chance of cure. Otherwise no operation will be successful, and a transurethral procedure will continue normal bladder function for maximum life expectancy with minimum discomfort and danger. For tumors in the dome of the bladder, a subtotal cystectomy is advocated.

Curable tumors include: papillomas, elevated carcinomas and small early infiltrating carcinomas. Incurable tumors include: extensive malignant papillomas, extensive carcinomas, recurrent infiltrating carcinomas and tumors seen late and after local spread has occurred. Radical endoscopic operation is curative for the first group. Endoscopic operation is more palliative for the second group. Cystoscopic follow-up examinations should be done every few months.

For radical electroresection the Stern-McCarthy resectoscope is used with a short beaked bladder tumor sheath. The tumor is resected until its base is attained. Resection of the bladder wall is begun wide of the base in the normal region, 1-2 cm. away from the edge of the tumor base. The wall is cut through down to the white fibers of the adventitia. The tumor base is removed with the surrounding area of wall. The bladder wall is fulgurated at the edges of the excavated hole and bleeding points are coagulated. Bladder rest by retention catheter is carried out for a few days. Five case histories are reported. 3 figures.

Complete Excision of Pelvic Viscera in the Male for Advanced Carcinoma of the Sigmoid Invading the Urinary Bladder. *Alexander Brunschwig, New York, N. Y.* Ann. Surg. 129: 499-504, April 1949.

The feasability of complete excision of pelvic viscera in the man has been demonstrated in the present study as a counterpart of the method devised for advanced pelvic cancer in the woman.

A 46 year old man with a previous laparotomy for carcinoma in the sigmoid colon was found to have a carcinoma in a redundant sigmoid. This had attached itself to the dome of the urinary bladder. A double barreled colostomy was done at the junction of descending and sigmoid colon. Some months later the patient had severe chills and fever, and disability even after the temperature returned to normal. Rectal study disclosed a mass, apparently fixed to the bladder anteriorly. Upon surgery a carcinoma was found which seemed to be continuous with the dome of the urinary bladder. In the center of the mass was an abscess which was accidentally ruptured. The mass, which was mobilized, consisted of tumor plus lower sigmoid and pelvic colon and urinary bladder. The sigmoid colon was transected about 6 cm. below the double barreled colostomy and each end invaginated. A small segment of sigmoid remained as the lower limb of the colostomy in the left lower quadrant. The mesosigmoid was transsected at its origin. The segment of ileum involved in the mass was divided; in isolating mesentery corresponding to this segment of ileum, large vessels to the cecum were transsected and ligated. The cecum immediately became cyanotic and was also excised. The ascending colon was transsected in its midportion and the upper segment was invaginated. The ileum was anastomosed to the ascending colon end-to-side. The ureters were transected at the fourth lumbar vertebra. The right ureter was implanted into the upper ascending colon by a modified Coffey I technic. The left ureter was implanted similarly into the descending colon about 6 cm. above the colostomy. The abdominal wound was closed, with rubber drains in the inferior angle of the wound. With the patient in lithotomy position, the levator ani muscles were divided and the anal colon completely mobilized. The lower parts of the pelvic colon were liberated on both sides. The urethra leaving the inferior part of the prostate was transsected. The inferior and lateral attachments of the latter were divided completely. Bladder, prostate, anal, pelvic and sigmoid colons with tumor mass and attached segments of ileum were removed through the pelvic floor. In repair of the floor, a rubber tube was left to drain the lower true pelvis. The operation took five hours. Fluids were given intravenously. The histologic diagnosis was adenocarcinoma of colon with invasion of bladder, ileum, and metastases to lymph nodes in mesosigmoid. The postoperative course was complicated by deep pelvic abscess and abdominal wall abscesses. Urinary and fecal colostomy drainage was satisfactory throughout. The patient was discharged 39 days postoperatively, ambulatory and with no pain or fever. After one year and two months his activities are fairly normal and he is free from pain. 1 reference. 3 figures.

A Review of a Series of 100 Cases of Vesicovaginal Fistulae. *R. G. Krishnan, Andhra Medical College, and King George Hospital, Vizagapatam, India.* J. Obst. and Gynaec. Brit. Emp. 56: 22-27, Feb. 1949.

A review is given of 100 cases of vesicovaginal fistulas which were seen from January 1945 to April 1948. Classification was done according to size, *i.e.*, large, small, and pin-hole. There were 31 cases of large, 61 of small, and 8 of pin-hole fistulas. In classifying the fistulas by situation, they were juxta-urethral, midvaginal, juxtacervical, and combined. There were 45 cases of juxta-urethral, 21 cases of midvaginal, 21 cases of juxtacervical, and 13 cases of combined fistulas.

Other pathologic changes found in these cases included: prolapse of the bladder mucous membrane through the fistulous opening; destruction of urethra; severence of urethra from the bladder neck; blokage of urethral opening at the proximal end; visibility of ureteral opening at the edge of the fistula; destruction of vaginal part of cervix; burial of vaginal part of cervix under the vaginal mucosa; adhesions of fistula to cervix and pubic arch; contraction of the vaginal lumen. All cases were operated on by the flap-splitting procedure, except 4 in which new urethras were produced. Twenty of 21 midvaginal, 17 of 21 juxtacervical, 29 of 45 juxta-urethral, and 7 of 13 combined fistulas were cured at the first attempt. Combined vesicovaginal, and rectovaginal fistulas were all operated upon at the same time. In ureteral transplantations, both ureters were transplanted at the same time. It is stated that repair by the abdominal approach is always unnecessary, and that ureteral transplantation should not be done before an attempt is made to close the fistula regardless of its size. Cesarean section is advocated in most pregnancies after a successful repair. 6 references. 2 tables.

The Surgical Treatment of Vesico-vaginal Fistula Following Hysterectomy and Radium Treatment for Carcinoma of the Cervix Uteri: Case Report and Comment. *A. A. Moon, Sydney, Australia.* M. J. Australia 1: 316-18, March 5, 1949.

Vesicovaginal fistula is far more common after operation than after obstetrical injury and the greatest single cause is hysterectomy by any method. Fistulas from radiation to the cervix for cancer were particularly difficult because of poor blood supply, fibrosis, and the presence of tough edges. The average duration of life for cancer patients who developed fistulas has been reported as about five months. Fistula usually occurs about a year after radium therapy and is generally caused by progress of the carcinoma. The incidence of fistula is increased when there is prior radium therapy. A clean vagina and clean urine are essential preoperatively. Preliminary suprapubic cystostomy is not advised. Careful cystoscopic examination should be done. In repair, low spinal anesthesia plus intravenous sodium pentothal, is suitable. In operating, the vaginal approach is the method of choice; the Sims operation (1862) with use of wire sutures is successful in postoperative fistulas. The position of the patient varies with the nature of the fistula. The major operative principles include: ready

access to the fistula, free mobilization of the bladder, accurate apposition without tension, and preservation of blood supply. Postoperatively, the bladder must be kept empty and clean, most effectively with an indwelling catheter. Vaginal treatment is contraindicated. Cure rates of 85% and over are reported.

An illustrative case in a 48 year old woman is presented. Certain points in the history of the case are significant: there was an apparent four and a half year cure of carcinoma of the cervix with known vaginal recurrence after total hysterectomy and treatment later with radium; after one month of radium treatment for vaginal recurrence, a vesicovaginal fistula developed. There was no indication of growth and it was possible to do straightforward operative treatment of the fistula almost three years after it had developed. Although the immediate result of operation was not fully successful, the fistula closed spontaneously. 10 references.

An Operation for the Treatment of Stress Incontinence. *Wilfred Shaw, St. Bartholomew's Hospital; St. Andrew's Hospital, Dollis Hill, England.* Brit. M. J. 4615: 1070-73, June 18, 1949.

In typical cases of stress incontinence the external meatus is patulous and the urethra is prolapsed downward and forward so that the external meatus is below and behind its normal locus. Most cases are caused primarily by damage or loss of tone of the condensation of endopelvic fascia between the urethra and anterior vaginal wall. This condensation may be called the posturethral ligament. An operation is described in which the weakened posturethral ligament is replaced by a fascial strip from the thigh. Cases must be selected, since urgency and frequency of micturition must be distinguished from stress incontinence. The latter is diagnosed if the patient coughs with a full bladder and urine is discharged.

A strip of fascia lata is taken, 6—7 in. long, 1½ in. in diameter in the middle and 1/3 in. in diameter at either end. The urethra is exposed along the whole of its length, together with the neck and base of the bladder. The next stage is fixation of the fascial strip to the urethra with the intention that the sling shall support the urethra along its entire length, together with the neck of the bladder. The lateral ends of the fascial strip must then be manipulated so that a broad supporting hammock draws up the urethra and brings it forward toward the symphysis pubis. In this stage, skin incisions are made on the inner sides of the labia majora and considerable tissue is cut through to expose the bone. The retropubic space on each side lateral to the urethra is opened up. A drill hole is made through each pubic bone. The free end of the sling is drawn through the drill hole. The anterior vaginal wall is then repaired, and the ends of the sling are sutured to the tendinous tissues in the vicinity of the bore holes. The redundant ends of the sling are excised, exposed tissues in the skin incisions are impregnated with a powder of penicillin and sulfathiazole, and the skin incisions closed. Penicillin is given for three days postoperatively.

Fifty-one cases have been operated upon. One patient died. There was no case of osteomyelitis postoperatively. Three cases of mild suppuration in the pubic wounds arose. The fascial strip does not appear to be a significant source of sepsis if the area becomes infected. An advantage to the operation is that there is no risk of injury to the bladder or urethra. Some cases developed cystitis which cleared rapidly. Urgency of micturition is the worst complication and may persist several months; however, only 1-2 patients have suffered in this way. Drilling holes in the pubic bones is simple to perform and is the only way to obtain a correct inclination of the sling. 14 references. 5 figures.

12. Urethra and Glands

Diverticulum of the Female Urethra with Multiple Calculi. *M. Ratner, I. Ritz and M. Siminovitch, Jewish General Hospital, Montreal, Canada.* Canad. M. A. J. 60: 510-12, May 1949.

Diverticula are probably acquired and are rarely congenital. The former arise secondarily to urethral strictures, passage of calculi, instrumentation, trauma of pregnancy, or infection of urethral glands. Most diverticula are false, consisting primarily of chronic inflammatory components. The commonest complaints are urgency, frequency, dysuria, and hematuria. Dyspareunia is often the presenting symptom. Diagnosis is suspected by vaginal examination when a mass is found anteriorly and purulent fluid is expressed from the urethral meatus by pressure on the mass. Crepitations are elicited if calculi are present. The diverticulum is seen by catheterization or by urethrocystogram. Some patients, after voiding, can evacuate the diverticulum by manual expression; some are treated with a sclerosing solution. Surgical excision by the vaginal approach is the method of choice. This involves amputation of the sac with closure of the diverticular orifice. An indwelling urethral catheter sidetracks the urine. The sphincter must not be injured. Recurrence and fistula formation are rare.

An illustrative case in a 60 year old white female with congenital diverticulum and multiple calculi is presented. The diverticulum completely encircled the urethra, and the diverticular orifices were present in the posterior third of the urethra. An attempt was made to remove the diverticulum postmortem. A complete removal was impossible because of extensive scarring and intimate association of the urethra to the diverticulum. No line of cleavage could be found resulting in a tear of the urethral wall. The calculi was then removed per urethram by enlarging the diverticular orifices. Two small but not two large stones were readily extracted. If a similar case should present itself, no attempt will be made to remove the diverticulum; it should be incised retropubically and the calculi extracted, after which the diverticular orifices should be enlarged for adequate drainage. 10 references. 4 figures.

Radium Therapy in Carcinoma of the Female Urethra. *Robert E. Fricke and James T. McMillan, Mayo Clinic and Foundation, Rochester, Minn.* Radiology 52: 533-37, April 1949.

Carcinoma of the female urethra is uncommon; it is important because it is fatal if not discovered and treated early. The proximal half of the urethra is most often affected but any region may be involved. Therapy is of 4 general varieties: cautery, excision, radium therapy, and roentgen therapy. Cautery and excision are more applicable for small tumors or for those confined to the proximal part of the urethra. In the distal region these methods may involve permanent incontinence. Radiation may be given with cautery and excision, but in advanced lesions only radiation is used. Radon seeds or radium needles may be implanted into the tumor. Radium tubes may be placed inside the urethra or vagina. Involved inguinal nodes may be treated by excision or irradiation. Roentgen therapy is used for pelvic extensions of the lesion.

Thirty-five cases are reported. Radium was used either alone or with other therapy. The average age was 52.4 years. The chief symptoms, in order, were: dysuria, a mass at the external meatus, frequency, and bloody discharge. Less frequent symptoms included: hematuria, urinary retention, incontinence, and dyspareunia. Most lesions were in the proximal urethra, but the whole urethra was involved in advanced cases. All lesions were infiltrating, and some were ulcerated. Biopsy was done in 30 of the cases and a microscopic diagnosis made. In 26 of the cases there was enlargement of inguinal lymph nodes.

No definite therapeutic routine was followed. Radium or radon was applied in three ways. First, interstitial implants of radon or interstitial radium needles were employed. Second, radium or radon tubes were placed directly against the lesion. Third, radium at a distance of 1 cm., was directed at the lesion by a vaginal applicator. Metastatic lymph nodes were treated by radium or x-ray therapy. Roentgen therapy was used only to treat inguinal nodes or for general pelvic radiation in advanced carcinoma. Fifteen of 34 traced patients survived five years or more following diagnosis. Of 13 patients who had radium therapy alone, only 2 survived five years. Of 10 who had radium and x-ray therapy, 5 lived five years or more. Of 9 with surgery and radium, 7 lived five years or more, and of 2 with surgery plus radium and x-ray therapy, 1 survived five years. The best results were obtained in patients treated by surgery and radium. Radium alone gave the poorest results but this group contained the most advanced cases. 13 references. 3 tables.

A Technique for the Repair of Recto-Urethral Fistula. *Samuel N. Vose, Boston, Mass.* J. Urol. 61: 790-94, April 1949.

The repair of recto-urethral fistula by a rectal approach is described. A 63 year old man was admitted with complete urinary retention. A perineal prostatectomy was done under spinal anesthesia and an adenomatous pros-

tate weighing 82 Gm. was removed. A longitudinal tear of the rectum was repaired, the bladder was drained by a rubber tube and urethral catheter, and the perineal operative wound was closed. On the seventh day the rectal repair broke down and urine was discharged from the rectum. The urethral catheter was removed on the tenth day. The location and extent of the fistula were studied by rectal examination and cysto-urethroscopy. Under caudal novocaine anesthesia the McCarthy panendoscope was passed and a fistula was seen about ¾ in. long, just proximal to the internal sphincter. A soft rubber catheter was passed into the bladder and the patient placed in Buie position to explore the rectal aspect of the fistula. A speculum was inserted and the fistula was seen just above the anal sphincter; the urethral catheter could be seen through the fistula.

After preparation of the patient the anal sphincter was dilated to admit 4 fingers and the speculum was reintroduced. The rectal mucosa was separated from the muscle wall for about 1 cm. in all directions and the edges of the urethral portion of the fistula were freshened with a scalpel. Using a small curved needle, the edges of the muscle wall of the rectum were approximated with 4 interrupted stitches of 00 catgut. The rectal mucosa was brought together by vertical mattress sutures. A catheter was left for constant drainage in the urethra, and removed on the tenth day. Two days later some urine discharged through the rectum. Using a speculum, a pinhole was seen at the lower end of the repair and this healed completely by use of silver nitrate caustic stick. Three other cases were repaired using the same technic. In one instance the fistula was a combined recto-urethral-perineal structure. The perineal fistula healed spontaneously when the rectal part was repaired. 5 references. 3 figures.

The Treatment of Hypospadias. *Fred Z. Havens and Albert S. Black, Mayo Clinic and Foundation, Rochester, Minn.* J. Urol. 61: 1053-64, June 1949.

In treating hypospadias ideal results are obtained if the patient has satisfactory sexual intercourse, has a urethra of adequate caliber without hairs or sacculation, and has the urethral opening at or near the tip of the glans penis. These results are obtainable in many patients. The Edmunds' operation was used for correction of the chordee, and is described in detail. All or most of the missing portion of the urethra was reconstructed later by an inlying tubular graft. Through Edmunds' operation, ample skin is made available for ventral closure after the fibrous tissue is removed and the penis straightened. The tubular graft provides a urethra free from sacculation and without hairs in it, and it usually allows the meatus to be located at the normal position. Patients with minor hypospadias usually need no surgical treatment except when the meatus is very small and a meatotomy is indicated. The child with hypospadias should never be circumcised because removal of preputial skin will make the problem of correction difficult.

The chordee should be corrected early (4 to 8 or 10 years of age) but the missing portion of the urethra should not be constructed until about the age of 16. The penis is then normal in appearance early in life. Restoration of normal sexual function is paramount in treatment, and the patient should be operated on again, if necessary, for correction of the chordee. There should be good evidence that the patient can have satisfactory sexual intercourse before considering urethroplasty. The inlying tubular graft method for urethroplasty is sound, and of 85 patients treated by this method, good results were obtained in 93%. 5 references. 16 figures.

Hypospadias: a Method to Improve the Chordee Effect. *Charles Ferguson, U. S. Marine Hospital, Staten Island, N. Y.* J. Urol. 61: 1052, June 1949.

In repair of hypospadias most operators resect the fibrous tissue causing the chordee entirely or they make transverse incisions, dissection of fibrous tissue, and transverse closure according to Heineke's method to correct the curvature. During the primary stages of the procedure, traction instruments, such as rubber bands and splints, are used. Transplants of rib cartilage were employed successfully in these cases. The fibrous tissue is excised throughout the pendulous area. A small pocket is produced in the distal and proximal regions of the resection. A piece of rib cartilage of desired length is removed and transplanted into the prepared bed. Each end of the cartilage is inserted into its pocket of fascia which has been prepared. The penile skin is then sutured across the defect. There is no apparent inconvenience from the transplants and they are satisfactory for overcoming the congenital curling effect. 1 figure.

13. Penis

See Contents for Related Articles

14. Urine and Semen

Nature and Significance of Neutral Steroids in Human Urine in Normal and Abnormal States: With a Preliminary Consideration of the Adrenal and Gonadal Steroids and the Factors Which Influence Their Secretion and Biological Action. *William W. Engstrom, Yale University School of Medicine, New Haven, Conn.* Yale J. Biol. & Med. 21: 21-85, October 1948.

The steroids of the adrenal cortex are reviewed; 28 have been isolated thus far, of which 11 are biologically active. Adrenal steroids are grouped into those which affect chiefly salt and water exchange, those that act on carbohydrate and protein metabolism, and those which are androgenic, estrogenic, or inactive. Several steroids have been isolated from animal testes. Testosterone is considered to be the male sex hormone, but estrone, estradiol and other steroids are isolated from testes. There is overlapping of the potentialities of the so-called sex hormones.

The factors which control formation and secretion of steroid hormones are only partially understood. The anterior pituitary has a major role in controlling the adrenals, and also the gonadal secretions. Knowledge concerning the biologic transformations that steroid hormones undergo is reviewed. Unfortunately there are no studies in man that indicate the manner in which a disease might influence these transformations. The various steroids which have been isolated from normal and abnormal urines are listed; their nature and sources are also considered. It becomes apparent that no single steroid can be considered completely characteristic of either tumor or "hyperplasia". Individual cases vary greatly in their elaboration and excretion of hormones.

Clinical conditions associated with abnormal amounts of steroids in urine are discussed. An effort is made to summarize the clinical disorders which are associated with abnormal or normal levels of 17-ketosteroid excretion. The patterns of 17-ketosteroid excretion in conditions classified as being representative of adrenal cortical hyperfunction are described. Other lesions, especially in children, may simulate the symptoms of these hyperfunctioning adrenal lesions. It is thus imperative to study each patient individually. Hormone assays should be used only as an adjunct to a careful history and physical examination. If it appears that there is an adrenal cortical hyperfunctioning lesion, a study of urinary steroid excretion may help differentiate tumor from "hyperplasia". In regard to clinical manifestations of adrenal tumors, age and sex partly determine the type of clinical response. Miscellaneous conditions which are associated with varying amounts of steroids in urine are considered. These include virilizing ovarian tumors, male pseudohermaphroditism, true hermaphroditism, and "natural" precosity in children, male hypogonadism, and acromegaly. Certain conditions are associated with decreased amounts of steroids in urine. The lowest values are found in women with Addison's disease and in patients with destruction of the pituitary. 250 references. 15 tables. 4 figures.

The Use of Urinary Pigment Excretion for the Measurement of Basal Metabolic Rate. *Jefferson J. Vorzimer, Ira B. Cohen and Jules Joskow, Beth Israel Hospital, New York, N. Y.* J. Lab. & Clin. Med. 34: 482-86, April 1949.

Patients reported to the clinic directly after arising; they voided urine which was discarded. After resting one hour a B.M.R. determination was done with a respiratory calorimeter. The pigment/creatinine ratio was determined on a urine sample obtained after completing the B.M.R. test. To avoid variations in the apparent concentration of urinary pigment from chemical change after voiding, urine samples were refrigerated, and spectrophotometric readings were done as soon as possible. The urine was centrifuged to remove sediment. Supernatant urine was placed in a 10 by 75 ml. cuvette and the per cent light transmission at 420 μ determined with a Coleman Junior spectrophotometer. Urine creatinine content is determined by a modification of the Jaffe reaction. Urine, 0.1 ml., diluted 1:5 with distilled

water, 2 ml. of saturated picric acid, and 0.15 ml. of 10% sodium hydroxide are placed in the 10 by 75 ml. cuvette. After standing ten minutes, the per cent light transmission at 520 μ is determined in the spectrophotometer. The creatinine concentration was determined from a graph made by plotting per cent light transmission against varying dilutions of a standard creatinine solution. Determinations were made in 156 adult women and 57 adult men. Most subjects had B.M.R.s in the normal range. The number of cases above the normal range was large enough and correlated well with the findings in the normal group. The curve is thus applicable to hyperthyroid states. Cases below the normal range were too few to permit definite conclusions about applying the curve to hypothyroid states.

The B.M.R. readings on women varied from 72% of normal to 162%, with a mean of 108.4%, and a standard duration of 18.8%. Pigment/creatinine readings ranged from 124 to 536, averaging 243.8, with standard deviation of 80.2. The correlation coefficient was 0.92. The standard error of estimate was 7.4%. The regression line was B.M.R. equals 54.7 + .22 pigment/creatinine. In men, B.M.R. varied from 83 to 159%, averaging 109.9%, with standard deviation of 15.0%. Pigment/creatinine readings ranged from 124 to 394, with standard deviation of 52.2. The correlation coefficient was 0.88. The standard error of estimate was 7.1%. The regression line was B.M.R. equals 57.0 + .25 pigment/creatinine. The data indicate an extremely close relationship between B.M.R. and pigment/creatinine. This latter ratio can be used as a measure of basal metabolism. The basal metabolic rate can be computed from equations: for men: B.M.R. equals 57.0 + .25 pigment/creatinine; for women: B.M.R. equals 54.7 + .22 pigment/creatinine. 6 references. 2 figures.

The Number of Motile Spermatozoa as an Index of Fertility in Man: a Study of 406 Semen Specimens. *Edmond J. Farris, Wistar Institute of Anatomy and Biology, Philadelphia, Pa.* J. Urol. 61: 1099-1104, June 1949.

Analyses were made on 406 semen specimens supplied by 239 men. About 90% of fertile men were studied within three months of the time that their wives had become pregnant. Each specimen was usually collected at least five days after the last emission. Seventy specimens were collected from 49 men who were fathers. All 49 had at least 83 million or more active sperm in the total ejaculate. Higher active sperm counts, both per cc. and in the entire ejaculate, were found in men whose wives co ceived readily than in those whose wives conceived with difficulty. Twenty-three men gave 46 specimens, each man supplying a second specimen which was secured 24 hours after a previous ejaculation and collection. Those men who had 185 million or more active fertile sperm on the first day had counts of 83 million or more moving fertile sperm on the next day. Men with counts of less than 185 million active sperm on the first day had subfertile counts of less than 83 million moving sperm the next day. When the total active sperm count

was less than 83 million, conception had never occurred. It appears that subfertility occurs when there are less than 80 million active sperm in the total ejaculate.

Males are classified by their absolute motility counts as highly fertile, relatively fertile, subfertile, and sterile. Males of unproven fertility with over 185 million active sperm in the total ejaculate are considered highly fertile, and those with a range of 83 to 185 million are considered relatively fertile. Those with less than 83 million active sperm are subfertile. This classification is asserted to be the best means of evaluating the fertility of the individual, short of his ability to produce offspring. 1 reference. 3 tables.

A Technique for the Accurate Determination of Sperm Motility. *Gerard L. Moench, New York, N. Y.* Urol. and Cutan. Rev. 53: 406-08, July 1949.

Examination for sperm motility must be done as soon as possible after ejaculation. A friction specimen produced at the examiner's office is best, since external factors can be controlled. Samples obtained by coitus interruptus are not advisable since ejaculation is incomplete and the volume of the specimen cannot be determined. Intercourse with a condom is preferable, with immediate removal of the semen to a clean dry container. The condom contents are best removed by slitting the closed end. The container for semen should be small and tightly closed. It should not be warmed. Semen obtained from the vagina after coitus is likely to be contaminated with acid mucus which decreases duration of motility. Sexual abstinence for three to five days should precede semen collection; if the period of abstinence is too long, dead sperm appear in the sample; frequent intercourse reduces the number of sperm and increases the number of immature forms.

In judging sperm motility, a crowded mass of sperm should be diluted with 5% Ringer solution. It is denied that sterility is indicated when sperm numbers fall below 50to60 million sperm per cc.or when there is 20 to 30% of nonmotile sperm. Many sperm are normally temporarily immobile. To determine percentual motility, a count with a spermicidal agent (1% Dakin's solution) is made. The semen is diluted so that 25 to 75 sperm are present in each high dry power field of the microscope. After counting the total sperm per cc., a similar dilution is made with 5% glucose Ringer solution. The sperm should be evenly distributed in the microscopic field. The diluted semen is placed in the counting chamber and only nonmotile forms are counted. Results by this method are lower than an estimate gained by methods employing natural, undiluted semen. Duration of motility should also be tested. A good specimen shows loss of motility in five to six hours at room temperature. There is even considerable motility after 24 hours. Abnormal sperm may occasionally be more motile than normal sperm and may remain motile as long or longer. Motility is no criterion for fertilizing power. 5 references.

Hyaluronidase Concentration in the Semen as a Test for Patency of the Vasoepidymal Ducts. *Lewis Michelson and Peter Koets, Stanford University School of Medicine, San Francisco, Calif.* J. Urol. 61: 803-05, April 1949.

In a study of hyaluronidase (Hase) concentration in the semen of men in 233 infertile marriages, 31 specimens had no sperm. Seventeen of these contained Hase; the lowest concentration was 0.008 mg. per cc. in case 1 (primary hypogonadism). The highest amount was 0.100 mg. per cc. in case 8 (unknown etiology). The average was 0.055 mg. Testicular tissue was obtained by biopsy in 5 cases.

The observations are summarized: Case 3: arrest of spermatogenesis, all tubules; arrest of spermatogonia and Sertoli cells; occasional spermatids present; several tubules fibrosed; normal Leydig cells; Case 6: degeneration of germinal epithelium; decreased number of Sertoli cells; no fibrosis; Leydig cells present. Case 7: focal spermatogenic atrophy; some tubules show only Sertoli cells and others the usual number of spermatogonia and spermatocytes; spermatids decreased in number; spermatozoa uncommon; Leydig cells unchanged. Case 13: normal testis tissue. Case 14: mild germinal epithelium atrophy; spermatogenesis arrest at spermatid stage.

Since the testis is the only genital organ producing Hase, its presence in ejaculated semen is a definite indication that the testis is producing it and that the ductal system is patent. Since it is apparently produced only in the seminiferous tubules, its presence in the semen indicates there is not complete degeneration of these testis areas. In Case 6, the right testis had been removed because of cancer and the patient received 20 deep roentgen treatments. A biopsy was made of the other testis. Only Sertoli cells were present in the seminiferous tubules. The ejaculated semen had a Hase concentration of 0.020 mg. per cc. This suggests that some Hase is formed independently of the spermatogenic cells.

Hase in ejaculated semen with no sperm is of diagnostic value in determining patency of the efferent duct system of the testis; it also suggests that there is not complete degeneration of germinal epithelium or that some of the enzyme is formed in cells other than these. 6 references. 1 table.

A Study of Hyaluronidase in the Semen of the Husband in Infertile Marriages. *Lewis Michelson, John O. Haman and Peter Koets, Stanford University School of Medicine, San Francisco, Calif.* J. Urol. 61: 799-802, April 1949.

The semen of 233 husbands of infertile marriages and of 18 controls of proven fertility were analyzed by a viscosimetric method to determine the hyaluronidase (Hase) concentration per cc. The viscosimetric apparatus was constructed along the lines described by Werthessen, Berman, Greenberg and Gargill (1945). The semen was diluted after receipt with an equal volume of Hayem's solution. The patients' wives were apparently fertile. The Hase concentration of specimens was measured by determining the rate of hydrolysis of hyaluronic acid as expressed in the decrease of its viscosity

in solution. Hyaluronic acid was prepared by extracting umbilical cords with cold water, followed by precipitation with cold alcohol and potassium acetate; the acid was stored in dry form.

The relation between Hase concentration y (in mg. per cc.) and the sperm count x (in millions per cc.) was found to be expressed by the equation: $y^2 = .0053$ x for the patients' semen specimens, and by the equation: $y^2 = .0059$ x for the controls. For sperm counts lower than 60 million per cc., the Hase concentration is on the average higher than that computed by the equation. An average of .055 mg. Hase per cc. occurs in the semen of many patients without spermatozoa in the ejaculate. 3 references. 1 table. 2 figures.

Spermatolysis: A Cause of Male Sterility. *Cafer Yildiran, Trabizon-Numune Hospital, Turkey.* Brit. M. J. 4604: 575-76, April 2, 1949.

Some cases of male sterility are caused by agglutination and dissolution of sperm shortly after ejaculation; this is spermatolysis. Such a process was considered to be the cause of sterility in 5 of 75 cases studied. In 2 of these 5 there was no abnormality of the sperm except for lysis. Seminal fluid must be examined periodically; if only one examination is done, and that too early, spermatolysis may be unrecognized. Spermatolysis may be associated with otherwise normal sperm or with abnormal sperm. If the latter, a lysin factor is perhaps produced in the epididymis, vas deferens, seminal vesicle, and prostate.

In Case 1, an apparently normal man was infertile. His sperm, 30 minutes after collection, showed no abnormality. After two hours the specimen separated into a clear supernatant fluid and a sedimented layer. The clear layer was acellular but the sediment contained dying sperm. After six hours all sperm were dead. This is spermatolysis. Case 2 appeared normal. The seminal fluid was rather viscous, and normal in all other ways up to two hours when agglutination began. After six hours spermatolysis was complete. In both cases (1 and 2) prostatic fluid caused spermatolysis when added to normal seminal fluid. Case 3 had oligospermia and hypokinesia as shown by a spermiogram. In two hours spermatolysis was complete. In Case 4 there was a history of gonorrhea but no evidence of epididymitis or prostatitis. On microscopic examination the semen appeared normal but showed asthenospermia. Spermatolysis was complete in five hours, but the prostatic fluid did not affect normal seminal fluid. In Case 5 observations were normal except for asthenospermia. Spermatolysis was complete in two hours.

The data indicate that two abnormal sperm types were concerned. In the first type, exemplified by Cases 3, 4, and 5, oligospermia and hypokinesia were present. Possibly the factors producing this also produced spermatolysis. In the second type, exemplified by Cases 1 and 2, the only abnormality was spermatolysis. It is assumed in all cases that spermatolysis caused the sterility. It is thought that in spermatolysis there is a spermatolysin. Prostatic fluid in Cases 1 and 2 caused lysis in normal seminal fluid.

The prostatic secretion of these patients probably contained a "spermatolysin".

Significance of Ehrlich's Reaction in Cases of Melanuria. *A. J. Lea, Norcross, Blackpool, England.* Arch. Path. 47: 211-14, March 1949.

Ehrlich's reagent is often used to detect melanuria and is regarded as the most sensitive of such tests. Evidence is presented to show that the reaction is not a test for melanin but only for melanogen, and that a negative reaction can occur with true melanuria. A urine with a dark brown deposit which does not give a positive reaction with Ehrlich's reagent may yet be that of a true melanuria in which the indole derivatives have all been oxidized to melanin. This could easily happen with acid urines, especially where there is delay in examination.

A urine specimen was obtained from a patient with Addison's disease. It gave a strong positive reaction with Ehrlich's reagent but there was no melanin formation. The urine was acidified and allowed to stand two days, after which a melanin deposit formed. This was filtered off and the urine again tested with Ehrlich's reagent, the result being negative. Some of the removed melanin was replaced in the urine, but the result was still negative. A fresh solution of para-dimethylaminobenzaldehyde was prepared and tested against a standard indole solution. There was a strongly positive reaction. Fresh addisonian urine gave a positive reaction. The urine was acidified and melanin allowed to deposit for two days, but the pigment was not removed by filtration. Ehrlich's test gave no reaction. The test was then applied to known melanin but the results were negative. Oxidizing of tyrosine to melanin by tyrosinase was followed by the Ehrlich test. Two cc. of mushroom extract were added to 100 cc. of 0.02% tyrosine at pH 7.41 at room temperature; 0.5 cc. were removed periodically and an equal quantity of Ehrlich's reagent added. The reaction became negative again when a medium brown color developed in the reacting mixture. Melanin formation appeared to be complete by 0400. The reaction had become positive and had become negative again shortly after melanin formation was evident. It appears that the Ehrlich test gives positive reactions until the actual formation of melanin. 6 references.

15. Scrotum

See Contents for Related Articles

16. Testis

Testicular Pain: Its Significance and Localisation. *Francis R. Brown, University of St. Andrews, and Royal Infirmary, Dundee, Scotland.* Lancet 6563: 994-99, June 11, 1949.

Renal pain is not referred to either the testis or ovary. It is not true that 2 types of pain arise from injury to the testis, namely, local pain from slight trauma, and pain in the loin from more severe trauma. True testicular

pain is no more located within the scrotum than appendicular pain is located in the right iliac fossa. The view is put forth that sensations arising in tissues which have been developmentally or artificially displaced from their primary relative positions and which keep only their original innervation are always localized in the respective primary relative positions of those tissues. When healthy tissues are displaced during normal development, there is no corresponding shift in the localization of pain. True visceral pain is asserted to exist.

Both ovarian and testicular pain are felt in the lower abdomen. Failure to know this fact has caused the removal of many healthy appendices and has admitted women with gynecologic disorders to general surgery wards. The man may complain of pain in the testis, whereas the woman complains of pain, not in the ovary, but in the labium of the vulva. Both sexes usually complain of a concomitant pain in the upper thigh. A mechanism common to both sexes produces and distributes these so-called referred pains. The pains of both sexes are localized in the territory supplied by the genitofemoral nerve. If the ureter is obstructed, one of the types of pain produced is pain projected to the tunica vaginalis or the labium majus. This is probably caused by direct irritation of the genitofemoral nerve by the contractions of the ureter overlying the nerve.

It is emphasized that coincidence of tissue and the position of the pain evoked in it are largely fortuitous. It may be assumed that light trauma to the testis produces local intrascrotal pain and that more severe trauma produces true testicular pain; in the former case the genitofemoral nerve of large cross-section and low pain threshold is stimulated; in the latter a stronger stimulus is needed to evoke pain in the testis which is innervated by autonomic nerves of a small caliber and high threshold. In general, degree of sensitivity and accuracy of localization depend on: the richness of afferent nerves in the tissue concerned; the cross-section of these nerve fibers (the larger the cross-section the greater the excitability and velocity of nerve impulse and the lower the threshold); and the threshold level under the conditions of the moment. 15 references. 7 figures.

Effect of Neutron Radiation on the Human Testes: a Case Report. *John N. Robinson and Earl T. Engle, Presbyterian Hospital, and College of Physicians and Surgeons, Columbia University, New York, N. Y.* J. Urol. 61: 781-84, April 1949.

An apparently normal 26 year old white man was accidentally exposed to a neutron bombardment for a fraction of a second. Shortly afterward he lost the hair on the front of his scalp and on his face. His white blood count was decreased and clotting time was prolonged. Libido and potency remained normal. Three weeks after injury there was no evidence of spermatozoa. After three months his hair began to grow again.

About nine months later a bilateral testicular biopsy was done under pentothal anesthesia. In the right testis the tubules were normal in size and configuration. The epithelial component of the tubules was made almost

wholly of Sertoli cells, and in many tubules these cells dehisced from the basement membrane. There were a few spermatogonia, some with a vacuolated hydropic cytoplasm. The intertubular cellular components were normal. Interstitial cells were normal in number and distribution, but contained considerable lipochrome pigment. This is usually seen only in testes in old men. In the left testis, the tubules were normal in size and configuration, and the epithelium of most contained only Sertoli cells. Spermatogonia were present, frequently as very large cells with large dark nuclei and hydropic cytoplasm. Very few tubules contained all the stages of spermatogenesis. The testes were apparently severely damaged; the prognosis is poor for renewed spermatogenesis. A second bilateral testis biopsy was done 20 months after the first. In the right testis, the tubules were regular in contour and unequal in size. The cell population was normal in the large tubules. Some small tubules had a greatly reduced cell content. All stages of spermatogenesis appeared, with many pycnotic macroforms. Abundant fuchsinophile crystalloids appeared in the Sertoli cells. In the left testis, the tubules were unequal in size, with some tubular fibrosis. Small tubules were lined by Sertoli's only or with Sertoli cells plus a few spermatogonia. Large tubules showed spermatogenesis with few mature sperm. Sertoli cells had crystalloids. The right testis has thus improved but the left testis showed residual damage. It is of interest that spermatogenesis began to return between the twelfth and fifteenth month. It is not yet known whether the semen analysis will return to normal limits. 2 references. 1 table. 2 figures.

17. Epididymis

See Contents for Related Articles

18. Spermatic Cord and Vas

See Contents for Related Articles

19. Seminal Vesicals and Ejaculatory Ducts

See Contents for Related Articles

20. Prostate and Verumontanum

Evaluation of Preoperative Factors in Prostatic Surgery: a Review of 404 Consecutive Cases. *P. Jorda Kahle and Paul L. Getzoff, Louisiana State University School of Medicine, and Charity Hospital of Louisiana at New Orleans, New Orleans, La.* J. Urol. 61: 775-80, April 1949.

A study was made of 404 patients who came to prostatic surgery from 1940 to 1946 at the Charity Hospital. There were 216 Negro patients and 188 white patients. The white mortality was 11% and the Negro mortality

6%. The over all mortality was 8.5%. There were 364 transurethral prostatic resections and 40 suprapubic prostatic enucleations. Most white patients requiring prostatic surgery were between 61-80 years of age. Most colored patients were between 51-70 years. The preoperative blood pressure was somewhat higher in the Negro race in respect to marked hypertension. Blood urea nitrogen determinations showed no significant discrepancy between the racial groups or in the mortality breakdown. There were more normal phenolsulphonphthalein findings in the Negro group (64%) than in the white patients (50%). Over 50% of the patients were admitted in acute retention. Eighty-two per cent of all had preoperative indwelling or suprapubic cystostomy drainage. Sixty-five per cent of this latter group developed some untoward reaction. The incidence of unfavorable reactions to indwelling catheter drainage predominated in the older age groups. In the group that died, the Negro patients showed less tolerance to catheter drainage than the white patients. The preoperative hospital stay of those who died in the hospital was more than twice that of the survivors. This does not mean that this period of time was decided upon as the optimum time for surgery.

The large incidence of catheter reactions is startling. Infection and complications occur in patients who were in fairly good condition prior to manipulation. Indwelling catheter drainage should be used only in those patients who are in chronic urinary retention, in cases of diminished renal function associated with high urinary residuals, or in patients who have high residuals of infected urine. It is emphasized that prolonged preoperative hospitalization is a mistake. 1 reference. 6 tables.

Osteitis Pubis. *M. Abrams, I. Sedlezky and David B. Stearns, Boston, Mass.* New England J. Med. 240: 637-41, April 21, 1949.

Osteitis pubis is rare. Five cases are presented; 2 followed retropubic prostatectomy, 2 followed suprapubic prostatectomy and 1 followed an abdominoperineal resection for rectal carcinoma.

The causation is obscure; urine, escaping into the space of Retzius, accumulates in retropubic soft tissues and produces an inflammation that progresses until the bone is involved. At this point clinical symptoms are manifested. Trauma to the symphysis pubis, by retractors, drains, or needle puncture, may be an etiologic factor. The diagnosis is made readily. A history of recent prostatic surgery and development of localized pain over the symphysis pubis indicate this condition. The pain gradually becomes severe and radiates to the perineum and inner parts of the thighs. Pain is aggravated by motion of the lower extremities. The only physical observation is localized tenderness over the symphysis pubis. A suprapubic sinus is occasionally seen. There is mild fever in the early stages, and a leukocytosis. The urine contains white blood cells and bacterial organisms. The final diagnosis rests on x-ray evidence. Earliest bone changes are demonstrated with a fine-focus tube, a small cone, and Bucky diaphragm, with the patient in prone position, the rectum being free of gas and feces. The medial

articular regions of the pubic bones are predominantly involved. The first change is blurring of the bony contours associated with osteoporosis of the adjacent bone. The symphyseal regions of the pubic bones then undergo slow but progressive erosion. Healing is evidenced by arrest in bone destruction and deposition of dense sclerotic bone at the edges of the widened symphysis pubis. The healing period varies from two to six months. Differential diagnosis includes a simple prevesical space infection without bone involvement, acute and chronic hematogenous osteomyelitis of the pubic bone, a metastatic lesion from the prostate, and primary bone sarcoma.

Treatment is nonspecific. In the acute phase, intense suprapubic pain necessitates complete bed rest, and opiates and sedatives are indicated. In the present series deep x-ray therapy and massive doses of vitamin B complex components appeared to help 1 patient, but were ineffective in 2 patients. Penicillin, streptomycin, sulfadiazine and sulfathiazole were ineffective. The disease is self-limiting and surgery is unnecessary. 14 references. 2 figures.

Subtotal Extirpation of the Granulomatous Prostate. *Reed M. Nesbit and Jack M. Lynn, University of Michigan Medical School, Ann Arbor, Mich.* J. Urol. 61: 766-74, April 1949.

Data are presented on 7 patients who had subtotal surgical removal of granulomatous prostates. In 3 of the cases the prostate was the only genitourinary organ involved. There were 9 operations done without a fatality. These included 1 perineal enucleation, 2 suprapubic enucleations, one of whom later had a transurethral resection, and 6 transurethal operations on 5 patients. Pathologic analysis disclosed: tuberculosis associated with benign prostatic hypertrophy in 2 cases; tuberculous vesical neck contracture in 1 case; contracture after suprapubic enucleation in 1 case; benign prostatic hypertrophy, carcinoma, and tuberculosis in each of three cases. The tuberculous infection was restricted to the prostate in 3 cases and probably restricted in another.

Transurethral resection done on tuberculous prostates does not result invariably in miliary dissemination of the disease. The problem of genital tuberculosis is complicated in that the differentiation between tuberculosis of the prostate and chronic nonspecific granulomatous prostatitis must be based on bacteriologic analyses. Histologic examination alone is insufficient for diagnosis. 14 references. 1 table. 2 figures.

Extravesical Prostatectomy: a Comparison of Retropubic and Perineal Prostatectomy. *Robert Lich, Jr., Owsley Grant and Joseph E. Maurer, University of Louisville School of Medicine, Louisville, Ky.* J. Urol. 61: 930-42, May 1949.

Retropubic prostatectomy is considered anatomically; the significant facts are the fatty tissue in the retropubic area which is relatively avascular; the prostatic sheath which is highly vascular, with large veins throughout its lamellae and more prominent anterolaterally; the pubo-prostatic ligament

which is vascular and may cause hemorrhage in the radical operation, and the true prostatic capsule within which lies the cleavage plane for enucleating the prostatic adenoma. Methods of conservative and radical retropubic prostatectomy are reviewed.

A series of 65 retropubic and perineal prostectomies are compared. Both methods showed comparable results and postoperative periods. Pentothal was the anesthetic in each group, either alone or in combination with spinal anesthesia. The average age in the perineal group was 68.8 years and in the retropubic series 68.1 years. Vesical catheter drainage in the perineal group averaged 10.1 days as compared to 6.0 days in the retropubic group. The postoperative hospital stay was 17.9 days in the perineal group and 12.3 days in the retropubic series. Retropubic patients had a more comfortable and more active postoperative period. In the perineal group, blood transfusion was used in 43 cases (66.1%); in the retropubic series it was used in 8 cases (12.3%). The retropubic group appeared to have a lower morbidity. In the first five days the average temperature was 100.0°F. in the perineal series and 99.4°F. in the retropubic group. Microscopic examination showed normal urine in 31 days in the retropubic series, and in 27 days in the perineal group.

In 65 perineal patients, 7 individuals suffered temporary stress incontinence, all of less than 19 days' duration. One patient suffered incontinence for almost three months. In the retropubic series 3 patients had stress incontinence, 2 of less than five days' duration and 1 for more than two weeks. The size of the adenomata removed by both methods was of similar proportion. The incidence of prostatic neoplasm was 8.2% in the perineal series and 5.1% in the retropubic series. It is more difficult to diagnose prostatic carcinoma in retropubic prostatectomy. 5 references. 6 figures.

A "Third Ureter" in Prostatectomy. *A. Wilfred Adams, M.S., England.* Brit. M.J. 4609: 809, May 7, 1949.

While there are advantages to bladder closure in prostatectomy, there is frequently reactionary bleeding, with clots lodged in the urethral drain. The postoperative technic of artificial "diuresis" is designed to compensate for surgical oliguria and for the low output of urine resulting from subnormal intake of liquids. This technic employs a "third ureter", and its automatic action relieves the patient of repeated subjection to forceful syringing. It can be used after the Harris, Hey, or Millin prostatectomy.

If Millin's technic is employed, a small Lister bougie is inserted by way of the bladder neck and pressed up against the dome of the bladder, which is incised so that the tip will protrude. After cutting the tip, the catheter is slid along by its open end, the sound is withdrawn with the catheter into the bladder and detached. The catheter is anchored to the skin by a stitch, and strengthened by elastoplast so that it will not come out by an accidental pull. Irrigating fluid in a douche can by the bed is siphoned through a glass drip, which interrupts a glass connection joined to the outer

end of the catheter with rubber tubing. The catheter draining the bladder is suspended by a nylon thread piercing the bladder and abdominal walls about 1 in. from the midline, and is attached to a Harris metal rod. The outer end is joined to a rubber tube which is not too easily compressed, and which ends about a foot from the bottom of the bucket. Irrigation proceeds at the rate of about 50 drops a minute for a few hours, and is then adjusted by a screw clamp to insure a safe speed of dilution. A clear channel is assured by releasing the clamp and flushing the system. Continuous irrigation can be heard and seen by this method. At the end of 48 hours the water is usually light red or clear. Careful attention is needed only to be sure that there is an outflow corresponding to the intake. The procedure can be interrupted while the patient is ambulatory, and the third ureter can usually be removed by the third or fourth postoperative day, with little or no subsequent leakage. 1 figure.

Cytologic Diagnosis of Carcinoma of the Prostate. *Peter A. Herbut, Jefferson Medical College, Philadelphia, Pa.* Am. J. Clin. Path. 19: 315-19, April 1949.

Examination of prostatic secretions for neoplastic cells is valuable in diagnosis of prostatic carcinoma. A positive diagnosis is most valuable in cases that are clinically questionable. A negative smear does not imply freedom from carcinoma. A method, recommended as a routine laboratory procedure, is described.

Prostatic secretions are obtained by digital massage. The seminal vesicles should be avoided because their contents dilute desired prostatic secretions. The fluid is deposited directly on slides to prevent autolysis, 1 drop to each of 3 clean slides. Each drop is covered with another slide and compressed, the top slide then being pulled several times over the bottom one. The slides are pulled apart and immediately dropped into a mixture of equal parts of 95% alcohol and ether, for 15 to 20 minutes. They are stained by the Papanicolaou method (1942). Smears may be dried at room temperature after fixation and stained even up to one month or more later. Every part of the slide is examined under a magnification of 100 times, or 400 times when abnormal cells occur. For comparison with other cells, secretions may be first examined from normal, inflamed, and hypertrophied prostates, and also from the urethra, prostate and seminal vesicles.

Cancerous and noncancerous prostate secretions cannot be differentiated grossly. Microscopically, noncancerous secretions contain epithelial or inflammatory cells. Epithelial cells are of 3 types: urethral, prostatic, and seminal vesicular. Urethral cells are the same large, flat, pavement cells that are so often found in urinary sediment. Normal prostatic cells appear singly or in groups not exceeding 3-4. Each cell is small, with a nucleus occupying one-half the cell volume; the over all staining is light or moderately dark blue. The cells of seminal vesicular epithelium are characteristic. They are almost always single, and 2-4 times the size of the

prostatic cells. They are almost always round, have sharp borders, deeply staining eccentric nuclei, and deep bluish-green cytoplasm. In addition, sperm are almost always found in great numbers agglutinated to the cells. Inflammatory cells are of the usual appearance. Neutrophils, lymphocytes, plasma cells and macrophages may be present. Neoplastic cells that are easiest to identify appear in large, irregular sheets; the borders of the masses are irregular, frayed and indistinct. The over all hue varies from bluish-green to light brown or very light orange. Each cell is about twice the normal size or may equal those from hypertrophied prostates. Cell boundaries are always indistinct or absent and the cytoplasm is syncytial. Nuclei are numerous and occupy one-half or more of the cell volume. There may be clumps of cells appearing in rounded or oblong nuggets; they are usually quite large, the mass having a sharp outline.

In 66 patients with prostatic carcinoma, the diagnosis was proved by paraffin sections in 48 and was certain clinically in the other 18. Neoplastic cells were found in secretions of 54 of the 66 patients. 2 references. 4 figures.

21. The Musculoskeletal System

See Contents for Related Articles

22. The Respiratory System

See Contents for Related Articles

23. The Cardiovascular System

Hypertension and Urological Disease. *Homer W. Smith, Sc.D. New York, N. Y.* Am. J. Med., 4: 724-40, 1948.

The cause of essential hypertension remains unknown. Despite the large amount of experimental knowledge available from the Goldblatt experiment, it is not yet demonstrated that the human disease has its origin in either pathologic or functional disturbances of the renal circulation. The data can be interpreted equally well in terms of a generalized and perhaps complex pathologic process which, by arteriolar sclerosis and possibly other mechanisms, attacks the renal parenchyma along with other organs. Although sympathectomy lowers the blood pressure in some instances, it is not yet demonstrated that it changes the temporal progress of the disease.

Pathologically elevated blood pressure is well known to be labile in many persons and susceptible to reduction spontaneously and by prolonged bed rest, psychotherapy and many non-specific agents which have in common only the "enthusiastic treatment of a worried patient." Blood pressure is an unreliable guide to the presence or severity of the disease, and more reliable criteria are needed.

Statistical data on blood pressure among the general population indicate that the incidence of essential hypertension, quite low before the age of 20, increases rapidly thereafter until at the age of 40 approximately 25% of the general population are affected, this figure increasing to 60% or more in elderly persons. There is no convincing evidence that this already high incidence of hypertension is increased by urologic disease (nephrolithiasis, hydronephrosis, prostatic hypertrophy, intrarenal pelvis, nephroptosis, perinephritis, congenital aplasia, pyelonephritis), or, conversely, that the incidence of urologic disease is any greater among hypertensive patients than among normotensive patients. At present the only way a causal relationship between urologic disease and hypertension can be demonstrated in any particular patient is by "curing" the hypertension by removing the offending organ. Because of the lability of pathologically elevated blood pressure, rigid criteria must be observed: i.e., clear demonstration of pre-existing hypertension, clear demonstration of reduction of blood pressure to normal levels (140/90 or below) and clear demonstration of persistence of pressure at this level for one year or longer. Review of the literature on unilateral nephrectomy reveals that these criteria have apparently been fulfilled in only 47 instances out of 242 reported operations. These 47 instances indicate that unilateral renal disease may be a cause of hypertension in rare instances but the very rarity of success (19%), coupled with evidence that the bulk of urologic disease does not cause hypertension, still leaves a reasonable doubt about the hypothesis. The advisability of nephrectomy must rest upon conservative and recognized surgical indications, and not upon the hope of reducing blood pressure. If bilateral disease is present, and it usually is present in advanced hypertension, as a result of the hypertensive process itself, nephrectomy may shorten life by removing an important fraction of total available renal function. 124 references. 5 tables.

The Relation of Vascular Disease to the Hypertensive State: II. The Adequacy of the Renal Biopsy as Determined from a Study of 500 Patients. *Benjamin Castleman and Reginald H. Smithwick, Massachusetts General Hospital, Boston, Mass.* New England J. Med. 239: 729-32, Nov. 11, 1948.

In a previous report anatomic observations in renal biopsies removed from 100 hypertensive patients subjected to bilateral dorsolumbar sympathectomy were reported. The biopsies were graded according to the severity of the vascular disease without knowledge of clinical data about the patient. There were enough differences in the degree of vascular disease to classify the group into 5 grades of advancing severity. Twenty-eight per cent and possibly 53% had renal vascular systems so slightly damaged that it seemed unlikely that blood flow could have been embarrassed enough to be the one factor causing the hypertension. The hypertensive state was then said to antedate the renal vascular lesions; these lesions in turn probably aggravated the hypertension. It has been objected

that a small biopsy specimen is not an adequate sample of the entire kidney, but this is unlikely under the conditions of the study. In the present report, the work has been extended to a series of 500 patients.

The results give conclusive evidence that the biopsy specimens are adequate samples of their respective kidneys. First, about the same percentage of cases for each biopsy grade was present in a series of 500 cases as in the initial series of 100 cases. Second, in 100 patients where biopsy specimens were gathered from both kidneys, the grade of vascular disease was identical in 75% of the cases, and there was a difference of two grades in only 5%; therefore, in 95%, the degree of vascular disease was essentially identical on both sides. Third, in the group of 100 double biopsy specimens, 40 patients showed minimal or no arteriolar disease on each side. Fourth, the correlation was good between the biopsy grades and renal function as determined by the phenolsulphonphthalein test in 500 patients and in 20 patients when compared with renal plasma-flow values. Fifth, the correlation was fairly good between biopsy grades and retinal vessel changes when applied to the lowest and the highest grades. Sixth, 62.5% of 61 patients under 30 years of age had minimal or no renal vascular disease.

The biopsy material apparently gives an adequate basis for conclusions regarding the degree of arteriolar disease in hypertensive cases. In résumé, 23.4% of the biopsies were put in Grade 0 or 1, and 22.5% in Grade 2. Thus of 500 cases, 45.6% showed minimal or no vascular narrowing. It is concluded that hypertension may exist without renal vascular disease; other factors precede renal vascular disease and cause the hypertensive state. 4 references. 5 tables. 2 figures.

Hypertension Following Renal Infarction. *John Wainwright, Victoria University of Manchester, Manchester, England.* Lancet 1: 62-63, Jan. 8, 1949.

A case was recorded of a patient aged 47, with a four years' history of increasing cardiac failure. A diagnosis of chronic rheumatic heart disease with mitral stenosis, auricular fibrillary and congestive heart failure was made. The blood pressure was 110/80 mm. Hg. then and when readmitted two months later. A week later he complained of pain in the right loin, suggesting renal embolism. The blood pressure, recorded at weekly intervals, gradually increased in three weeks to 210/100 mm. Hg., when he was having attacks of cardiac asthma. He died a week later.

Necropsy showed an irregular pale infarct occupying most of the right kidney, with complete occlusion of the renal artery by a dark red thrombus from its aortic orifice to its bifurcation. Histologic examination showed early organization of the infarct and thrombus. It was considered that the observations indicated an embolic, rather than thrombotic, occlusion of the artery. Previously recorded cases were reviewed and it was pointed out that most were associated with congestive heart failure.—*Author's abstract.*

Pulmonary Embolism in Childhood. *George F. Stevenson and Fern L. Stevenson, St. Joseph Hospital, Fort Wayne, Ind.* J. Pediat. 34: 62-69, January 1949.

Literature on pulmonary embolism in children is reviewed and reference made to 29 cases reported elsewhere. Pulmonary embolism in children and young adults occurs more frequently than is generally believed. Of 1,282 cases of fatal embolism found in 46,742 autopsies, there were 16 cases in the 0 to 9 year group, and 25 in the 10 to 19 year group. These results represent only the necropsy incidence of pulmonary embolism. The condition in children is limited almost entirely to the nonoperative group. It followed operation in only 2 of 30 cases which were studied. Infectious disease, usually acute, antedated embolism in 15 of the cases, while chronic debilitating disease, not associated with acute infection, was the basis for embolism in 12. In 3 cases trauma was the apparent precipitating factor. In the infectious group the origin of emboli was in both the systemic circulation and in the heart. Necropsy data were available in only 16 of 30 cases. Embolism resulted in infarction in 8 cases; of these, the right lung was involved in 3 cases, and both lungs in 5 cases. Seven cases had no infarction. There were multiple small emboli in 9 cases, and a single massive embolus in 7 cases. Of the 16 cases, 13 had thrombosis of the veins within or just adjacent to areas of infection or trauma. In the other 3, thrombosis of the veins occurred at an area unrelated to the primary disease.

The clinical aspect of the disease in children is generally similar to that in adults. Most patients showed signs and symptoms which were suggestive or typical of pulmonary embolism. A marked feature was the frequency with which sudden death occurred. In 7 of 16 cases a single massive embolus caused sudden death.

A case of pulmonary embolism producing sudden death in a 9 year old boy is presented. Autopsy showed that death was caused by an embolus arising in partially organized thrombus in the inferior vena cava and the common iliac veins. The signs and symptoms seven and one-half months before death were those of bilateral thrombophlebitis of the lower extremities. The cause of the phlebitis was obscure. An episode of rightsided "pneumonia and pleurisy" two months before death was caused by minor pulmonary embolism, as seen by the finding of a healing infarct in the lower lobe of the right lung. Several small infarcts in the left lung occurred early on the day of death. Thrombosis developed in the inferior vena cava following thrombophlebitis of iliac and femoral veins. The preliminary small emboli and the final massive embolus arose from the new site. 25 references. 1 table. 1 figure.

24. The Hemic and Lymphatic Systems

See Contents for Related Articles

25. The Digestive System

See Contents for Related Articles

26. The Endocrine System

Results of Operations for Hyperparathyroidism. *William Barclay Parsons, College of Physicians and Surgeons, Columbia University, New York, N. Y.* Bull. New York Acad. Med. 25: 285-97, May 1949.

The results of operations on 32 patients with hyperparathyroidism at the Presbyterian Hospital are reviewed. Twenty-two of the group had a history of having passed one or more calculi, had renal or ureteral calculi, or had x-ray evidence of calcification within the renal substance. The renal function at the time of operation seems to determine the prognosis as to life expectancy. All cases showed an immediate return to normal calcium and phosphorous levels, except after the second operation on one case of recurrent carcinoma and one of multiple tumors. Five patients died of renal insufficiency and one of recurrent functionating parathyroid carcinoma, long after operation. In no case has there been any suggestion of solution of calculi after restoration of normal blood calcium level. New stones have not formed, but those present have not changed. Experience with secondary hyperparathyroidism because of severe renal insufficiency has been completely discouraging. Operation in this latter group gives disappointing results but most of the patients have had several years of relative comfort, which makes operation worth while even in the face of grave renal disease.

The age and sex incidence in this study agrees with that of Norris (1947). The site of the tumor is even, between the right and left side. Seven of the tumors were in the upper mediastinum, but the sternum had to be split in only 1 case. Both sides should be explored to determine the total parathyroid substance present. If a tumor is not detected easily, the tracheo-esophageal groove on both sides, the region behind the esophagus, and the upper mediastinum should be explored before splitting the sternum.

Postoperative treatment aims to keep an adequate urinary output and to control tetany. Oliguria or even temporary anuria may arise, perhaps because of the sudden shift in calcium excretion due to a drop in circulating calcium which follows the change in circulating hormones as calcium moves back into the skeletal system. If there is difficulty in taking water orally in the first two days, an intake of 3,000 cc. should be provided by intravenous supplementary therapy. To avoid sodium chloride retention, not more than 1 liter of dextrose in saline should be given; most of the intravenous soultion should therefore be dextrose in water. Patients with severe decalcification should be started on a prophylactic anti-tetany regime, with 5-10 Gm. of calcium gluconate in the infusion fluid, and 2 cc. of parathormone to be given in the afternoon. This is continued until the patient can eat milk and cheese. If tetany occurs, AT 10, hytakerol, should be given after a few days and the parathormone discontinued one week later. Viosterol should be given only in minimal amounts to avoid renal calcium deposits. Those with minimal decalcification may not exhibit tetany and require no

treatment, unless tingling or a Chvostek's sign appears. Diagnosis and operation prior to deformity and renal damage prevent these sequelae. 6 references. 5 tables.

Electrolyte Composition of Sweat: Clinical Implications as an Index of Adrenal Cortical Function. *Jerome W. Conn, Ann Arbor, Mich.* Arch. Int. Med. 83: 416-28, April 1949.

Samples of sweat were collected during a two hour resting exposure of the whole body to humid heat. Samples from hand and forearm were obtained in rubber gloves. To obtain sample from other skin areas, absorbent cotton was placed beneath a rubber dam and the latter sealed to the dried skin. Another square of rubber was sealed outside the first one. After the exposure the cotton was picked up and transferred to an air-tight weighing dish. After weighing, an exact amount of distilled water was added, and the cotton and water mixed to insure equal concentrations of electrolytes in the cotton and fluid. The fluid was analyzed. The cotton was dried to constant weight, and the difference was found between this and its first wet weight. From these data the electrolyte concentration in the sweat sample was obtained.

The sodium and chloride concentrations in sweat of normal subjects varied between 15-60 mEq. per liter, with a mean value of 42. Administration of desoxycorticosterone acetate (DCA) or of purified adrenocorticotropic hormone (ACTH) caused a great fall in these levels and reversal of normal relationship of sodium to chloride. When ACTH was used, there was an increase of androgenic steroids and of "11-oxysteroids", as well as the desoxy-like corticosteroid response. Sodium and chloride levels in sweat seemed to reflect the degree of activity of corticosteroids which influence electrolyte metabolism. Patients with untreated Addison's disease had sodium and chloride sweat concentrations greatly in excess of highest normal values. Use of DCA or of lipo-adrenal cortex brought down these raised levels. They rose again when treatment was stopped. The values are thus a diagnostic and therapeutic aid.

In 2 cases of adrenal cortical carcinoma, in 1 of which Cushing's syndrome was exhibited and in the other the adrenogenital syndrome, sodium and chloride sweat concentrations were very low. A woman with marked masculinization and raised urinary 17-ketosteroids had normal sodium and chloride sweat concentrations. Many syndromes are evidently produced by increased adrenal cortical function, each depending on the relative preponderance of 1 type of corticosteroid over the other. In Cushing's syndrome, not associated with adrenal cancer, sodium and chloride sweat concentrations were at or below the lowest levels obtained in normal subjects; they were much higher than those found in 2 cases of carcinoma. Panhypopituitarism gave values falling between the upper limit of normal and high levels of Addison's disease. 11 references. 7 figures.

Autoplastic and Homoplastic Transplants of the Rat Adrenal Cortex and Medulla to the Kidney. *Newton B. Everett, University of Washington, Seattle, Wash.* Anat. Rec. 103: 335-48, March 1949.

Three series of cortical and three of medullary transplants were made, namely, autoplastic, litter-mate, and a series where donor and host were from different strains. To determine effect of deficiency upon success of graft, one whole adrenal was removed from some hosts but not from others. Donor adrenals from the cortical series (excepting the autoplastic group from which no tissue was removed) were fixed and sectioned after excising pieces for transplanting. These were controls to determine what components were transplanted. The radial dimension of the excised cortical part was determined from control sections and compared with the corresponding dimension of the definitive graft. The dimension of the transplanted pieces varied from .13 to .174 mm. Transplanted medullary parts and autoplastic cortical parts, transplanted into hosts from which no tissue was removed, were comparable in size to measured cortical transplants. Adrenal components were placed beneath the renal capsule and left for 21 to 45 days. Except for a few medullary transplants given the chromaffin reaction, tissues were fixed in Bouin's solution and sections were stained with hematoxylin and eosin.

Most autoplastic cortical transplants were successful, usually increasing by 300% in 30 days, provided the outer cortex was transplanted. Ten of 11 grafts succeeded in which no adrenal tissue was taken from the host, whereas 13 of 17 succeeded where one entire adrenal was removed. Where the capsule was removed before transplanting the cortical piece, these differentiated the same as those in which the capsule was included. In some cases only capsule and adherent glomerulosa were transplanted with similar results. Although transplants of combined fascicular and reticular zones differentiated, their size increase was less than most grafts which included overlying cortex. One-fourth of cortical transplants to litter-mate hosts were successful. Only 1 of 19 cortical transplants between nonrelated hosts and donor rats persisted. In animals from which one adrenal was removed when making transplants, there was hypertrophy of the other gland. Cortical transplants of the two month and five to eight month tissues were equally successful. Sex did not affect the results. Medullary transplants were not so successful as cortical. Successful ones had persistent healthy cells and a positive chromaffin reaction, but no increase in component parts. A smaller percentage of autoplastic medullary grafts persisted in the host than litter-mate grafts where one adrenal was removed from the host. However, the quantity of persisting healthy medullary tissue was greater in the autoplastic series. Grafts in the litter-mate series showed lymphocytic infiltration not found in autoplastic transplants. Of 2 graft series between nonrelated hosts and donors, only 1 contained a few, atypical medullary cells, and the grafts showed marked infiltration of lymphocytes, macrophages and fibroblasts.

Autoplastic transplants of medullary tissue from younger animals and from the older group gave about the same percentage of takes. 25 references. 2 tables. 10 figures.

Androgenic Symptom Tumors of the Adrenal Cortex in Children: a Report of Four Cases. *George F. Cahill and John N. Robinson, Columbia-Presbyterian Medical Center, New York, N. Y.* J. Urol. 61: 680-87, April 1949.

Four cases of androgenic symptom adrenal cortex tumors in children are presented, 3 with practically only androgenic symptoms and 1 with androgenic and mixed metabolic symptoms. There were 3 girls and 1 boy. Each child was apparently normal from birth to a certain period; once a change began it became continuously progressive. The symptomatic effect seems to be from excess androgens, but the effect is often not entirely compatible with the amount of 17-ketosteroids excreted in the urine. Symptomatic changes in cases 1 and 2 were very similar, but there were 16.4 mg. of 17-ketosteroids in case 1 (female, 7 years of age) and 233 mg. in case 2 (female, 7 years of age) in 24 hours. The 17-ketosteroid excretions were comparable to the size of tumors, except for the largest tumor in the series (Case 3, a 7 year old female) which was a carcinoma with many areas of necrosis. A large amount of estrogen was excreted in the urine in all the cases. In the presence of estrogens, these cases had no nipple or breast changes. The male and female changes showed less than one would expect from each separate excretion titre.

Air insufflation adrenal x-ray was used for differential diagnosis between normal anatomical adrenals, adrenal hypertrophy and adrenal tumor. The tumor is visible on ordinary films in some cases; in some it is well shown on an intravenous urogram, more clearly defining the suprarenal mass after the renal tissue is more definitely identified by the iodide increased density and its displacement. Air insufflation x-rays are better to show the adrenals, particularly in children because air insufflates well through the fascial planes. Calcification of the tumors is common. Necessity for correction is such that an exploratory operation may be the choice. If hyperplasia only is found, adrenal resection, with studies to show the change in hormonal activity because of tissue removal, may be valuable or may indicate the amount of antagonistic hormone therapy needed. If the tumor is benign, correction is expected in most cases; if carcinoma is found, the prognosis depends on the type and growth of the tumor. 14 references.

Hyper-functioning Tumors of the Adrenal Cortex with Report of Eight Cases. *Waltman Walters and Randall G. Sprague, Mayo Clinic, Rochester, Minn.* Ann. Surg. 129: 677-701, May 1949.

A group of 8 cases of proved tumors of the adrenal cortex which exemplify problems found in diagnosis and surgical treatment is presented. This report supplements a report of 10 cases in 1934, and 7 in 1938. In the earlier studies, assay methods for urinary steroids were unknown or crudely developed and the effects of pure adrenal steroid hormones were hardly known.

The clinical pictures seen in hyperfunction of the adrenal cortex are very protean in character, and probably depend upon the type and amount of steroid hormones produced, the age and sex of the patient, and other, obscure factors. Methods of urinary assay help to differentiate between tumor and hyperplasia. The most spectacular changes produced by tumors of the cortex are those in the sexual sphere. The endocrine and metabolic signs and symptoms are most completely developed in Cushing's syndrome.

The predominant effects of many adrenal steroid hormones are on salt and water metabolism; desoxycorticosterone is the most familiar. Some of the known hormones chiefly affect metabolism of carbohydrate and protein; the most potent hormones of this group are: 11-dehydro-17-hydroxycorticosterone, and 17-hydroxycorticosterone. These probably explain the carbohydrate and protein disturbances seen in adrenal cortical tumors. Fat metabolism is associated with 11-dehydrocorticosterone. Some of the hormones have androgenic, estrogenic, or progestational effects, and include: adrenosterone, androstenedione, estrone, progesterone, 11-hydroxy-isoandrosterone, and 17-hydroxyprogesterone. Virilism probably results from excessive production of androgenic material by an adrenocortical tumor. Overproduction of estrogens or progesterone-like compounds might explain vaginal bleeding and sexual precocity in the female patients, as well as impotence and gynecomastia in males. An important fact in diagnosis is that a patient with a hyperactive tumor of the adrenal cortex and virilism is likely to excrete a considerable amount of 17-ketosteroids in the urine, and, on the contrary, if evidence of virilism is minimal or lacking, as in Cushing's syndrome, the 17-ketosteroid excretion may not be elevated. Among diagnostic aids to demonstrate adrenal tumors, a plain x-ray of the renal area may reveal a soft tissue shadow above one kidney, or intravenous urography will show a downward displacement of one kidney. Most tumors are so small that they neither depress the kidney nor are visualized after perirenal injection of air.

Removal of an adrenocortical tumor is hazardous. The possibility of postoperative adrenocortical insufficiency must be remembered, the signs being prostration, hypotension, tachycardia, and unusual fever. Adrenocortical extract should be given parenterally before and after the operation. It is unnecessary to expose both adrenals if the tumor is found on the side first explored. The approach is a posterolumbar incision like that used for kidney operations. The tumor should be entirely removed. Postoperative results are good in general and excellent if the lesion is benign. 16 references. 9 tables. 12 figures.

Cortical Carcinoma of the Adrenal Gland. *Elsa Lehmann, Vancouver General Hospital, Vancouver, British Columbia.* J. Pediat. 34: 650-53, May 1949.

A 17 month old white boy became feverish and listless two days before admission to the Vancouver Hospital. He could take only fluids, most of which he vomited. He had been well prior to this illness. The temperature on

examination was 104° F., pulse rate 130, respirations 25, weight 11.3 Kg. There was a mucopurulent nasal discharge, and the pharynx was moderately inflamed. There was a large, firm mass the size of a small grapefruit in the left upper quadrant extending from the costal margin to the umbilicus, and from the flank to the midline. It was not tender and was only slightly movable. The urine contained 1+ albumin and 2+ white cells in clumps. The red cell count was 4.1 million, hemoglobin 11 Gm., and white cell count 24,000 with a marked shift to the left; platelets were 269,000 and NPN was 28 mg.%.

Penicillin, 10,000 units, was given every three hours on admission, and two days later, 5 gr. of sulfadiazine every six hours to clear the urinary tract infection. After the first two days the temperature ranged between 99° and 100.6° F. Later urinalyses were all negative. An intravenous pyelogram showed a large, soft-tissue swelling in the left upper quadrant; following the dye injection, the left kidney was displaced downward. Filling was less complete than on the right, possibly because of pressure. The lack of gross deformity of the calyces on the left suggested that the tumor was extrinsic. The patient was given 150 cc. of whole citrated blood and the next day, under ether anesthesia, a well-encapsulated tumor of the left adrenal gland was removed through a left kidney incision. No metastases were visible. Postoperatively the patient received 250 cc. of whole blood and 500 cc. of normal saline. The immediate postoperative course was uneventful. Pathologic study of the specimen showed giant cell sarcoma of the adrenal cortex. Deep radiation therapy was given in 10 treatments; the patient was discharged with a red cell count of 4 million, hemoglobin 9 Gm. %, and white cell count 5,000. He was readmitted about one month and one-half later because of increasing pallor, lassitude and abdominal distention. The liver had enlarged into the right iliac fossa and was very firm and nodular. Ascitic fluid was present. The patient died five days later. Permission for autopsy was not granted. When the patient was first seen, a provisional diagnosis of Wilms' tumor was made, but this opinion was changed after pyelography. If the tumor were adrenal in origin it was believed to be a neuroblastoma, because there were no signs of cortical dysfunction. An adrenal cortical tumor was actually not suspected. It is of interest to note the clinical lack of any hormonal activity. 2 figures.

Neuroblastoma (Sympathogonioma) of the Adrenal in a Newborn Infant. *R. C. Larimer, Montreal, Canada.* J. Pediat. 34: 365-66, March 1949.

A Negress died nine hours after delivery. Pregnancy and delivery were not unusual. The baby had become cyanotic following delivery. Its abdomen was greatly distended by a mass filling the epigastrium and both flanks. There were 28,000 white blood cells per cu. mm. and 30% erythroblasts. Autopsy showed a neuroblastoma of the right adrenal with metastases to liver, parapancreatic lymph nodes, and left adrenal. The liver extended 9 cm. below the costal margin and weighed 425.5 Gm. The

right adrenal and tumor weighed 83.5 Gm. The tumor displaced the right kidney and duodenum. The case was unusual since the tumor was present during gestation. These tumors are rare at birth.

There are 2 main types of metastasis: to the liver, which is said to occur in younger patients; and to the osseous system, in older children. The 2 types may occur in a single patient, and have no clinical or prognostic value. The common presenting symptoms are an abdominal mass, exophthalmos, or tumor of the skull. Diagnosis is suggested by destructive lesions in typical bony locations. The tumor is moderately radiosensitive, and almost always fatal in one year from onset of symptoms. 5 references.

Malignant Pheochromocytoma and Hypertension: a Case Report. *Jerome Chamovitz and Herbert Fanger, Peter Bent Brigham Hospital, Boston, Mass* Am. J. Clin. Pathol. 19: 243-51, March 1949.

A case of malignant pheochromocytoma with hypertension in a 42 year old woman is presented. The patient was found to have hypertension in 1937, nine years before her death. She maintained an elevated blood pressure thereafter. In 1943 an intravenous pyelogram suggested a left adrenal tumor; this was found and removed at operation. There was no gross evidence of lymph node invasion or local extension but microscopic study of the tumor showed extensive capsular invasion, and some extension beyond the capsule and blood vessel invasion. Roentgen therapy was applied over the left kidney region because of possible malignancy. The blood pressure was normal for one year postoperatively and then rose again. Exploration of the right adrenal in 1944 did not reveal a second tumor. A right kidney biopsy showed marked arteriolar nephrosclerosis. The hypertension persisted and death occurred in 1946 from cardiac and renal failure. At autopsy the major diagnoses were: recurrent malignant pheochromocytoma of left adrenal with local extension and with metastases to mediastinal lymph nodes; malignant nephrosclerosis; left hydroureter and hydronephrosis, secondary to ureteral compression by tumor; multiple renal arterial thrombosis with infarction, left; hypertensive heart condition, shown by cardiomegaly and left ventricular myocardial hypertrophy; cardiac failure, shown by mural thrombosis of right auricle, bilateral hydrothorax, ascites, pulmonary congestion, and chronic passive congestion of liver and alimentary tract; and pulmonary embolism with infarction of lower lobe of right lung.

Eleven cases of pheochromocytoma have been reported in the literature, with gross or microscopic evidence of malignancy and associated with paroxysmal, malignant, or chronic hypertension. Earlier views stated that malignant pheochromocytomas were not associated with hypertension. There were, in all, 12 cases; each showed unilateral involvement, contrary to earlier views. Malignancy is not invariably indicated by cellular pleomorphism. Benign tumors may be vascular and contain groups of polygonal cells closely approximated by thin-walled vascular spaces. The cells vary in shape and size, and also may be multinucleated. Even benign tumors are so highly

vascularized and poorly organized that displacement of cells into vascular spaces while preparing microscopic sections may simulate malignant vascular invasion. A diagnosis of malignancy is more certain if there is metastasis or local invasion. 9 references. 2 tables. 3 figures.

Adrenal Medullary Tumors (Pheochromocytomas) in Mice. *Fern W. Smith, W. U. Gardner, Min Hsin Li and H. Kaplan, Yale University School of Medicine, New Haven, Conn.* Cancer Res. 9: 193-98, April 1949.

One hundred thirty-four BRS stock mice were castrated when four to eight weeks old. Eighty-one mice from 5 strains and 2 hybrid groups were given roentgen radiation at 30 to 40 days of age (1½ minutes per day for 12 days; total dose was 750 r). Nineteen of the latter group had no other treatment, while 13 received stilbestrol pellets or subcutaneous injections of estradiol (16.6 ug./wk.) for three months beginning shortly after radiation. Ten mice received 1 mg. progesterone weekly and 19 received 1.25 mg. testosterone weekly starting one month after irradiation and continuing through life. Seventeen mice received gonadotropic extract from pregnant mare's serum and extending from the second to the fifth month after irradiation. The mice were sacrificed when moribund or when tumors developed. Endocrines and other tissues were fixed, sectioned and stained.

Only one of the adrenal tumors in BRS strain animals enlarged the adrenal glands appreciably. The other 3 tumors or lesions were too small to detect postmortem and were diagnosed only microscopically. The enlarged gland was yellowish, nodular, and was about 5 mm. in diameter. In 2 mice the lesions were unilateral. Mice with tumors had thinner adrenal cortices. Only capsular tissue was left about part of the tumorous gland of the animal with the largest lesion and the rest of the cortex was thin. The cytoplasm of tumorous cells stained more deeply than that of normal medullary cells. The nuclei resembled those of normal medullary cells. The medulla contained scattered areas of hemorrhage. Tumorous medullary cells encroached upon the sinusoidal network usually found between cortex and medulla, and projected into the cortex. Smaller adrenal lesions in BRS mice encroached less extensively upon the cortices of their respective glands. They resembled larger tumors histologically. Three radiated mice had large medullary tumors 5 mm. or more in greatest diameter. The tumors were grossly atypical but were thought to be of adrenal cortical tissue. Histologically, the 3 tumors contained cells with more basophilic cytoplasm, smaller nucleus, and less extensive cytoplasm than in the normal medulla. One tumor contained fragments of or entire isolated adrenal cells. Adrenal cortex was found only around a part of the circumference of the tumors. The 2 smaller tumors were histologically similar to the larger lesions but the cells were slightly smaller. The tumors replaced part of the normal medulla and cortex without enlarging the gland. Non-tumorous glands of 76 animals containing no tumors showed no hyperchromatic nodules of medullary tissue, and mitotic figures were not seen. 12 references. 2 tables. 10 figures.

Monorchism: a Report of Two Cases. *George K. Kawaichi, Philip Cooper and Harold F. O'Donnell, Veterans Administration Hospital, Wichita, Kan.* New England J. Med. 240: 334-35, March 3, 1949.

A 20 year old man was admitted with a history of an undescended left testis since birth. Examination revealed a healed right inguinal herniorrhaphy scar. The right testis was normal. No testis was palpable on the left, but there was a fullness at the right external inguinal ring, suggestive of a testis. The prostate was normal. The left inguinal canal was exposed through the usual herniorrhaphy incision. Spermatic cord elements, including the vas deferens, were found leading into the scrotum. The testis was absent. Microscopic sections of tissues from the scrotum revealed atrophic epididymis, in which no sperm were seen, and vas deferens, but no testis tissue.

A 29 year old man was admitted with a diagnosis of right undescended testis since birth. The left testis was normal in size and position. The right testis could not be palpated. The prostate was normal. At exploration through a right inguinal incision, the spermatic cord was found in usual position leading into the scrotum, and ending in a ligamentous structure. The vas deferens ended in tissue somewhat suggestive of atrophic epididymis, but testis tissue was absent. The cord with attached tissues was removed at the internal inguinal ring. A herniorrhaphy was done and the wound closed. The peritoneal cavity was opened and a search made for a testis; the parietal peritoneum was incised lateral to the ascending colon and the retroperitoneal area searched, but no testis was seen. Microscopic study of removed tissue showed atrophic vas deferens but no definite epididymis or testicular tissue.

In the cases reported, the explanation for testicular absence is probably primary atrophy of the testis in one and primary atrophy of the testis and epididymis in the other. It is thought that in the presence of vas deferens and epididymis in the scrotum, exploration for the testis could be safely limited to exploration of the scrotum, inguinal canal, and peritoneal cavity in the area of the internal inguinal ring. This limited procedure is probably justified in the presence of a vas deferens in the scrotum only. 8 references.

The Use of Testosterone in the Treatment of Depressions. *Mark D. Altschule and Kenneth J. Tillotson, McLean Hospital, Waverley, Mass. and Harvard Medical School, Boston, Mass.* New England J. Med. 239: 1036-38, Dec. 30, 1948.

Thirty-one patients, from 31 to 74 years of age, were given testosterone. They included patients with depressed phase of the manic-depressive psychosis, with involutional psychoses with depression, with reactive depressions and, in one instance, schizophrenia with a marked depressive component. Only 3 were females, 2 with involutional psychoses and 1 with manic-depressive psychosis in the depressed phase.

Intramuscular doses of 50 mg. of testosterone were given daily for two or three weeks. Testosterone in most cases was given in 2 doses of 25 mg. daily. It was given in 1 case for six weeks, discontinued one month, and given for a month again. Some patients after discharge received 30 mg. per

day of methyltestosterone orally. Seven patients had electroshock therapy during hormone treatment; seven had shock previously, and 6 had shock therapy subsequently. Of 7 men given testosterone and shock together, all improved. Of 17 without shock therapy before receiving testosterone, 11 (10 men, 1 woman) were improved; 2 men had their treatment discontinued, and 4 men were not improved.

Of 4 men not improved by testosterone, 3 were given electroshock. All 3 improved, 1 after six treatments within a month, 1 after four treatments a week apart, and 1 after 32 shocks given over several months. Seven patients were given hormone during relapse after improvement with electroconvulsive therapy. Three of these given testosterone 1 month after relapse were improved; 2 women given testosterone one month after relapse did not improve; 1 man given testosterone five months after relapse improved; and 1 man given testosterone 12 months after relapse did not improve. In 2 patients who recovered after hormone treatment, relapse occurred when the drug was discontinued. All 3 patients in this group who did not respond to testosterone were later given shock therapy. The 2 women improved after 12 shocks given for five weeks but soon relapsed. Shock was again given to 1 of these patients who died during treatment. The man in this group improved after 6 shocks but relapsed after two months. Two patients were not fully treated with hormone because of development of edema, tachycardia and dyspnea; both had mild congestive failure previously. Two other patients had mild edema and shortness of breath. The women had heavy overgrowth of facial hair. Two men exhibited gynecomastia. Testosterone produces remission of mental symptoms in some patients with all types of depression. The hormone acts as a substance with strong anabolic effects. 9 references.

Long-Acting Preparation of Testosterone. *E. Carlinfanti, F. D'Alo, and L. Cutolo, Naples, Italy.* Lancet 1: 479-80, March 19, 1949.

Concentration of hormones in the blood and tissues must be high enough to exceed renal excretion and destruction in the liver, and this is accomplished best by intravenous injection. Repeated injections are impractible, and the usual aqueous suspensions cannot be used in ordinary fine needles. Combined with aluminum phosphate, testosterone is always ready for use, remains stable longer, can be used in a fine needle, and has the desired protracted action. Twenty ml. of an aqueous suspension of aluminum phosphate, 7 mg. per ml., is slowly added to 1 g. of crystalline testosterone in 10 ml. of 96% ethyl alcohol. After sedimentation, the natant fluid is poured off, and the residue is made up to 40 ml. with saline solution. Pure testosterone is preferred because it is less irritant than testosterone propionate. Satisfactory results have been obtained in certain morbid conditions, such as polycystic mastitis.

Comparison studies of the two types of suspensions were made on castrated guinea pigs for the effects on the weight of the seminal vesicles.

Two groups were injected with testosterone propionate dissolved in oil (25 mg. per g. of body weight) and with pure testosterone adsorbed on to aluminum phosphate. In the first group there was a rapid rise and fall in the weight, and in the second group a greater and more continuous action, reaching a peak 30 days or more later. This method is preferred to subcutaneous implantation of compressed pellets, eliminating the surgical procedure and frequent intolerance by the tissues. 2 tables.

Observations on the Effect of Methoxy Bisdehydro Doisynolic Acid as an Estrogen. *William P. Herbst, Washington, D. C.* J. Urol. 61: 795-98, April 1949.

Fifty rats received 0.1 or 0.5 mg. of methoxy bisdehydro doisynolic acid (MDDA) daily by stomach tube for 30 days. Their response was compared with that of rats receiving similar doses of ethynyl estradiol (EE). The effects were those expected of estrogens and the only differences between EE and MDDA were quantitative ones, MDDA always being more effective.

MDDA affects organs as follows: (1) pituitary: an increase in size, without striking cytological change; (2) ovary: some inhibition, owing to primary effects on the pituitary; (3) thymus: decrease in size; (4) adrenal: an increase in size, and vascularity; (5) uterus: some increase in size; (6) testis: marked inhibition; (7) seminal vesicle: inhibition; (8) kidney: no significant weight changes; (9) body weight: marked inhibition; (10) hemoglobin: no change; (11) red cell count: reduced, (12) white cell count: no change; and (13) differential count: no change, but neutrophiles increase at expense of lymphocytes. MDDA injected intrasplenically has more estrogenic activity than when given subcutaneously.

Three pairs of rabbits were injected intramuscularly each day with 1, 2, and 4, respectively, of MDDA for eight days and then all received 0.3 mg. progesterone daily for five days. The next day the uteri were removed, sectioned and stained. In all cases MDDA was highly effective in producing progestational proliferation.

Eleven patients with extensive malignancies, and 4 with benign hypertrophy were treated with small amounts of MDDA. The drug was as effective as stilbestrol in 6 of the 11 malignancies. The 5 in which it was unsatisfactory needed 25 mg. doses of stilbestrol parenterally to obtain relief. The dose varied from 6 to 24 mg. of MDDA. Four of the patients with benign hypertrophy, with residual not exceeding 3 ounces, were reduced of a residual from 0 to 15 cc. One of the 4 patients with benign hypertrophy and 4 of the cases with malignancies had definite breast reactions. There were no other untoward symptoms. 1 table. 2 figures.

27. The Nervous System

An Analysis of Regional Variations in the Response of the Detrusor Muscle to Electrical Stimulation of the Hypogastric Nerves. *Erling S. Hegre and Everett H. Ingersoll, Medical College of Virginia, Richmond, Va.* J. Urol. 61: 1037-47, June 1949.

The effect of faradic stimulation of the hypogastric nerves on the intact urinary bladder of the anesthetized cat was studied. Kymograms were made of the total bladder responses under both constant and variable pressures. The participation of different regions of the detrusor muscle in a single reaction was computed from a series of timed photographs of the exposed organ. The activity per unit length of small components of the muscle in representative areas was measured.

The following total bladder responses to a 30 second period of stimulation were found. There was an initial decrease in volume under a constant pressure of 7 cm. of water. The fluid volume expelled at this time was related directly to prestimulatory bladder volume. The bladder volume then increased for the remainder of the stimulation phase, and this continued for 20 to 30 seconds thereafter. The volume eventually increased beyond the prestimulatory level. There was a marked absolute increase only if the bladder had little fluid at application of stimulus. This increase lessened with increase in bladder prestimulatory volume. Pressure changes in response to bladder contractions had the same diphasic response; there was an initial unsustained rise in pressure and then a more or less marked drop in pressure to and beyond the prestimulatory value.

Measurements from a film record showed that all areas of detrusor muscle react to sympathetic stimulation by an unsustained contraction with subsequent relaxation. In a given total bladder response the proximal and distal bladder were unequally involved. Measurements of the change per unit length in various areas of the muscle revealed some differences: (1) in the excitatory phase of a given response the motor activity of the distal bladder half exceeded that of the proximal half by a quantity which increased with increasing prestimulatory bladder size; (2) during inhibition relaxation beyond the prestimulatory condition was greater in the distal half. Eventual relaxation was more pronounced as the prestimulatory bladder size decreased; and (3) some bladder areas following an initial contraction did not relax even to their prestimulatory condition. The motor response in those regions persisted to some degree. It is concluded that all areas of the detrusor muscle participate in a diphasic response to sympathetic stimulation. There are differences in the height of the responses in various regions of the muscle under a given condition. The state of the bladder at the time of stimulation partly determines the magnitude of each phase of the response. Responses of the proximal and distal halves of the muscle are affected unequally by alterations in the physiologic conditions of the experiment. 7 references. 5 figures.

28. Cancer Research

See Contents for Related Articles

29. Urologic Armamentarium

Radioscopy in Nephrolithotomy. *N. J. Nicholson, Louth County Infirmary, Lincs.* Brit. J. Urol. 21: 24-26, March 1949.

An apparatus which attempts to overcome the difficulties of radioscopy during nephrolithotomy is described. A Westinghouse or any other mobile x-ray apparatus may be used. The Westinghouse tubehead is fitted with a special cone to which is fitted an applicator made of brass and plated with chromium. The applicator has a circular shape to fit the cone but is oval at its open end, and is boilable. The applicator extends to the kidney exposed in the wound and limits radiation to the kidney; it rotates on the long axis of the cone.

The screening apparatus is placed in the wound on the side of the exposed kidney farthest from the applicator, and is joined to the kidney by thin endless detachable rubber bands. It consists of a pocket-shaped oval frame which houses the fluorescent screen. The base of the frame is hinged and permits the fluorescent screen to be removed when not working. A basal pillar connects the frame to a polished reflecting mirror which is ball-jointed to the pillar and can be turned in any direction. Radio-opaque calculi are seen in the reflecting mirror at 45 KV_p and 4 MA. If the kidney has a short pedicle, the apparatus is introduced narrow end first and the applicator is rotated to conform. All pieces can be autoclaved or boiled except the fluorescent screen. The cardboard screen lies in a tray of clear perspex (polymerized methyl methacrylate) and is covered by a lid of the same glass-like substance. The joint between tray and lid is sealed with perspex. Immersion of the perspex screen in 40% formaldehyde for 72 hours is effective and does not damage the perspex. The screen is not harmed by washing in soap and water or in ether. The screens may be stored in 40% formaldehyde until used. 5 figures.

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